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TUBERCULOSIS

ITS CAUSE, PREVENTION AND CARE

FRANK H. LIVINGSTON

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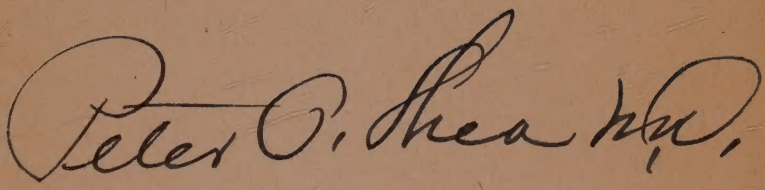

P. O. Shea, M. D.
Worcester, Mass.

TUBERCULOSIS
ITS CAUSE, PREVENTION, AND CARE

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TUBERCULOSIS

Its Cause, Prevention, and Care

P. O. Shea, M. D.
Worcester, Mass.

BY
FRANK H. LIVINGSTON

NEW YORK
THE MACMILLAN COMPANY
1930

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Set up and printed. Published October 1930.

SET UP BY BROWN BROTHERS LINOTYPERS
PRINTED IN THE UNITED STATES OF AMERICA
BY THE FERRIS PRINTING COMPANY

INTRODUCTION

I FIRST became actively tubercular in 1904 at the age of twenty-four, as a result of overwork and lack of proper food and rest.

In the light of my present knowledge and experience, I know from symptoms I then displayed that I had carried the infection in a dormant state from childhood, and that its presence should have been apparent to those responsible for my care and upbringing had they been informed concerning the disease and familiar with its signs.

While it is true that in those days the knowledge of the disease was limited (the germ was first isolated when I was two years of age), enough was known of it by the time I had my first attack to make me feel that I should have received better advice than I was given. Although I consulted, and was examined by, a number of physicians, none of them ever seemed

to appreciate the sinister nature of the disease, and none of them ever gave me a particle of helpful advice. One suggested that I join the Y. M. C. A. and take plenty of exercise. This I did, and boxed, fenced, punched the bag, ran miles every day on the running track, and, in fact, did about everything that an incipient tubercular should not have done, and nothing that one should have done. Another said that I needed more protein, and advised me to have some whole wheat cooked and to eat some of it each day. Another had me take port wine and raw eggs each day. Others prescribed various things, but not one of them in all these years ever mentioned the one thing I needed, and the one thing that would have done me the most good, and that was rest. None of them ever took the trouble to tell me anything of the real nature of the disease, and I had the rather hazy idea that pulmonary tuberculosis was a kind of inflamed or catarrhal condition in the chest that became chronic if it hung on long enough. I knew that people sometimes died of it, but then it seemed that some people did not have much vitality and

died easily anyway, while others were "tough" and could stand a lot.

Occasionally I ran across an article in a magazine telling me of the personal experiences of some tubercular, written so as to make a good story, but always indicating that the writer had scant knowledge of tuberculosis.

I went along until 1914, working all the time, but always in poor health. In that year it became necessary for me to submit to a serious abdominal operation which kept me under ether for three hours. I failed steadily following the operation, and a year later found it necessary to go to a sanatorium for treatment. Here I made a splendid recovery, and at the end of six months left, against the advice of the physician in charge, and resumed an active life. For eight years afterward I enjoyed the best health I had ever had. My throat then began to trouble me, and I was advised that my tonsils were bad and should come out. They were removed under a general anesthetic of ether, and as a result I have spent the slightly over five years since then in hospitals and sanatoriums fighting the old

enemy. I did not lay my break in 1915 to the ether, and consequently was not on guard when trouble came the last time. I know now that both relapses have been due to the ether.

After talking with dozens of people around sanatoriums who, like myself, have suffered from bad advice and ignorance of the nature of the disease, I decided to put in writing for the benefit of others the information and practical experience I have gathered. I am also impelled to do this by the fact that although I have been a tubercular for twenty-five years and during that time have constantly sought knowledge of the disease, I have never as yet found a thoroughly comprehensive book on the subject, that might be read and understood by a layman.

In writing this I have aimed to avoid technicalities, or anything that savors of "assuming the doctor's rôle," and to stick to the plain and practical facts that all who are tubercular or seek knowledge of tuberculosis should have. It is, however, impossible in a work of this nature for even a layman to avoid at least approaching the technical at times.

I cannot quote authorities, as my material has been gathered a little at a time over a long period from widely scattered sources.

Although the sources have been varied, they are believed to be reliable.

The thing that has struck me most forcibly in my experience and study has been the ignorance of, and lack of interest in, the disease displayed by many physicians.

There are in the United States various societies organized to handle and fight against tuberculosis, and they have accomplished much, but it has always appeared to me that they have displayed too strong a tendency to restraint. There seems to be a general timidity about coming out boldly and striking hammer blows. It would seem that a disease that at some time endangers the lives of seventy per cent of the population, and that completely changes the course of the lives of more than two per cent (one per cent of the population is tubercular, the other more than one per cent affected are the families of tuberculars) is entitled to more consideration than it has received. Certainly there would

seem to be no reasonable excuse for hiding the facts.

All of the books that I have read so far on tuberculosis have been written by doctors, and have had the doctor's point of view, which certainly is not the patient's point of view in many cases. This one is written by a layman, for laymen, and with the layman's point of view.

It is my hope that it may help to bring about a better understanding of the disease and its problems.

FRANK H. LIVINGSTON.

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TUBERCULOSIS
ITS CAUSE, PREVENTION, AND CARE

CHAPTER I

WHAT IS TUBERCULOSIS?

TUBERCULOSIS is a germ disease that most frequently attacks the lungs and bronchial tubes, but may involve any part of the body from the toes to the scalp.

It gets its name from the fact that the germs start to work in small spots. As they work they multiply, and the body builds up a wall of hard, fibrous tissue and minerals around the spot for protection and prevention of its spread. These spots become small hard lumps of various sizes, some being even as small as a pinhead. These lumps, or diseased spots, are called tubercles. They are especially noticeable when the disease attacks the tongue, as it sometimes does.

If the disease gets a good start before it is checked or healed, the tissues of which the body is composed break down, and some of them are consumed. It has then reached a stage which is

called consumption, because it is actually consuming the body tissues. This consumption is most apparent in the lungs, and in many cases the lung tissue is entirely eaten away in spots, and holes or cavities are formed. These may heal up, and the sick person regain a reasonable measure of health.

Tuberculosis is generally divided by doctors into two classes—human and bovine. The latter is acquired from cattle through drinking infected milk, and is more apt to attack the glands or some part of the body other than the lungs. There is also miliary or quick consumption, which spreads rapidly and runs its course generally within a few months. This type is invariably fatal. Most tuberculosis comes under the heading of chronic. This is the kind that more or less heals up and then runs for indefinite periods of time, sometimes the duration of a long lifetime. Many people live out their allotted span with it, and either die of old age or from other causes. It seems to be a disease to which the body can more or less accustom itself.

Tuberculosis is a very old disease and has been

known since ancient times. Greek writers were familiar with it and knew also of the value of sunshine and fresh air in its treatment. Back in the sixteenth century, Spanish doctors prescribed gold-coated pills for sufferers from it. An examination of ancient Egyptian mummies shows the ravages of the disease, and the Egyptian boy king, Tut-Ank-Amen, who lived several thousand years ago, and whose tomb has recently been discovered and opened, is believed to have died of it. The mummies of some Egyptian children who lived and died thousands of years ago also show signs of rickets, a disease whose cause is closely related to that of tuberculosis.

CHAPTER II

WHAT CAUSES TUBERCULOSIS?

TUBERCULOSIS is caused by a tiny germ that belongs to a family of bacteria related to molds. It is colorless and so small that it can be seen only through a powerful microscope, and then not until it has been stained with dye.

As stated in the previous chapter, there are two kinds of tuberculosis: namely, that caused by the human germ and that caused by the bovine germ, or the one received from cattle. As there is a slight difference, it is possible to tell them apart. The germs from cattle will cause the disease in man, and likewise the human germs will cause the disease in cattle, rabbits, guinea pigs, and other animals.

The germ of tuberculosis is one of the toughest and hardest to kill in the whole germ family, for the reason that it is covered with a waxy coating that is hard to dissolve. It will live for

about twenty minutes in five per cent carbolic acid. When sputum is being prepared in the laboratory to find out whether the tubercular germ is present or not, it is washed with five per cent carbolic acid. This acid bath kills all of the other germs, but does not hurt the germs of tuberculosis. For this reason it is impossible to put any medicine into the body strong enough to kill these germs, and so cure the disease, without also killing the patient. Within the last few years a preparation known as the Gold Cure (Sanocrysin) was announced by a Danish doctor. This Gold Cure is a salt of gold, and is apparently able to kill the germs within the body, but it proved to be impossible to give a dose sufficient to do any good without serious damage to the kidneys.

In tubercular infections there are usually other germs present besides those of tuberculosis. Sometimes there are several other kinds, such as those causing pneumonia, common cold, and pus-producing infections. Sometimes there are more of the other germs than there are of tubercle bacilli. These badly mixed infections

are usually more stubborn in character than the infection which is predominantly or purely tuberculous.

The tuberculosis germ was discovered and first isolated in 1882 by Dr. Robert Koch, a health officer in a small German town. He also perfected what he considered to be a cure for it. This was called tuberculin. It is still being used, but has proved to be of value only in carefully selected cases, and has been discarded entirely by many physicians who have had long experience with it.

A form of mold related to the common blue or black mold that grows around the home on decayed fruit and vegetables, and on old clothing, shoes, and the like, can cause an infection which is often mistaken for tuberculosis when it is breathed into the lungs. There are also some other forms of molds that may cause human infections. These mold infections can be distinguished from true tuberculosis by an experienced physician. Their treatment is very unsatisfactory, and they respond to treatment much less readily than do tubercular infections.

I should like to make a point here that I intend to stress strongly throughout this book, and that is that whenever a tubercular infection is suspected, a thoroughly competent physician who is experienced in the handling of tuberculosis should be consulted as quickly as possible. Tuberculosis is a disease that is not well understood by some physicians who are what is termed "general practitioners." It is a disease that requires experience for its diagnosis and treatment.

CHAPTER III

HOW, WHY, AND WHEN IS TUBERCULOSIS CONTRACTED?

UNTIL recently it has been generally believed that tuberculosis is in many cases inherited. The theory of actual inheritance or transmission of the germs of tuberculosis is no longer acceptable, but it is now understood that a weakness or tendency to acquire the disease easily may be inherited. This tendency may be overcome, however, with proper knowledge and care from birth to about twenty-five years of age. We shall go into this feature more fully in a following chapter.

Tuberculosis may be contracted in several ways. A common one is to breathe the germs into the bronchial tubes and lungs, where they lodge, and if conditions are favorable, start an infection or tubercle as explained in Chapter I.

Another common method is to take the germs

into the stomach through the drinking of milk from tubercular cows or from food that has been contaminated by flies, by germs blown upon it, or by handling by people who have infectious material on their hands. These are generally people who are themselves tubercular, and who are careless about matters of sanitation and personal cleanliness. One of the most common ways for children to contract it is by being fondled or kissed by tubercular people, or by coming into daily contact with infected persons in the home, especially when these people are careless about coughing or sneezing without covering the mouth and nose, and are not careful about their sputum.

As sputum from a tubercular person is filled not only with the germs of tuberculosis but with many other kinds of dangerous germs, it should not be carelessly spread around the house or grounds. The sputum may dry up and be blown into the air by the wind, and in this way be breathed into the lungs of children and other well people. This is especially dangerous for children or weak or sickly grown-ups, as the

germs are very apt to find lodgment and the person so infected becomes tubercular. If the sputum is thoroughly exposed to the sunlight, the germs are soon killed. The tuberculosis germ, although a hardy one, is killed by a few hours exposure to strong direct sunlight. The sputum may, however, drop into a shaded place, and may then dry up and be blown into the air before the germs have been destroyed. People whose vitality and powers of resistance have been lowered from any cause, such as sickness, exposure, or overwork, or who are in a run-down condition, are especially likely to contract the disease, as the tuberculosis germ is fond of weak or diseased tissue. This is why people who are just recovering from a serious illness, especially pneumonia, influenza (flu), or bad colds in the chest, should be careful to avoid coming in close contact with tubercular people.

The germs of tuberculosis are nearly always present in the body, even from the time shortly after birth, getting there in the air we breathe and on the food we eat. Under ordinary conditions of health the body takes care of them and

kills most of them off before they have a chance to do any harm, but usually a few of them find permanent lodgment and so are right on the job when they get a chance to cause trouble. Such a chance comes when weakness occurs through sickness, overwork, exposure, injury, excesses, or exhaustion from any cause. Many cases of chest injury received from wounds, or while working or playing, have caused an infection that has led to tuberculosis. Injuries received while playing football and other vigorous sports have been responsible for many cases.

Overambitious students attending college, especially those working their way through, often develop the disease as a result of run-down condition caused by long hours of work and study, improper or insufficient rest, and lack of properly nourishing food. It should be impressed on such students that they had far better spend another year in finishing their course than to take chances on breaking down, and contracting a disease that will hamper them for life.

During the last few years it has been fashion-

able for girls and women to have slim, boyish figures, and there has been much dieting to bring about the desired slimness. The results have been bad in many cases when the dieting was carried to extremes, or when it was done without regard for the proper maintenance of strength and vitality. There has been a considerable increase of tuberculosis among young women from about sixteen up to twenty-five years of age as a result of this fad. Fortunately it is passing, as well-rounded figures and curves are again permissible. It is to be hoped there will be less of this foolish dieting in the future. I have myself come in contact with a number of young women who contracted the disease in this manner and have heard directly of many others. One especially distressing case that came to my attention was that of a young woman of eighteen suffering from the disease as a result of her determination to be slim. She was one of three chums who had started on a diet at the same time. All three had become tubercular as a result of the lack of proper nourishment and two had died. The third was a very sick girl with a rather poor

chance for recovery. This is a high price to pay for a fad.

It is well to remember that a healthy, well-nourished body is the very best insurance not only against tuberculosis but many other diseases as well.

While it is true that some fat and well-nourished people do contract or develop tuberculosis, this is quite unusual, in fact, so much so, that it is almost safe to generalize and say that fat people never develop the disease.

An excess of fat is not desirable in healthy middle-aged or elderly people, but in younger people a few pounds extra weight is mighty good ammunition to have in reserve in case of any kind of sickness, and especially of tuberculosis. All tuberculars of any age should strive to put on and hold an excess of fat. There is nothing better than having a good reserve to tide one over a hard place.

The years during which the disease is most frequently either contracted or the foundation laid for its contraction in later life are from birth to ten or eleven years of age. Any age

under twenty-five is a danger time, but if one passes twenty-five in reasonably good health and has not already laid the foundation for the development of the disease, he has a very good chance of going through life without it. By the time one is about twenty-five the body has built up sufficient resistance so that the chances of contracting it are rather remote. Occasionally, however, people do develop it after this time, and numerous cases come to light of people even in the fifties breaking down with it. In practically every such case, however, a careful study of the history would show that they had contracted the disease many years before, and probably had carried it from childhood. It had been sealed in, as will be explained later, and consequently they had carried it all these years without its ever getting an opportunity to make a new start.

The terms "contracted" and "developed" have been used in connection with the disease for the reason that there is a great deal of difference between "contracting" the disease by one who has never had it before, and "developing" it by a person who has been carrying it for perhaps a

long time without knowing he has it. The latter person may have been in apparently good health practically all of his life up to the time of develing the disease, yet at some time he had grown tubercles which the body had healed and sealed in but which later broke loose under conditions of lowered bodily resistance, as already outlined.

Sometimes what may have been only a bad cold in the chest may have lit up a light tubercular infection which was eventually healed or rather sealed in by the body building up a protective wall around the infected spot or spots. In this case I should say that if there had been no tuberculous lesions in the body previously the party has "contracted" the disease. He may then carry these supposedly healed lesions for any length of time from a few months to many years and at some later time when conditions become favorable, due to the lowering of resistance, the germs may break out from the healed or supposedly healed lesions and become active. In a case of this kind it is proper to say that the unfortunate party has developed the disease which

was already present and only waiting a favorable opportunity to give trouble.

In this connection it is interesting to know that autopsies, or examinations made after death, reveal that close to seventy per cent of all human bodies so examined show the presence of healed tubercular lesions in the lungs. They appear as gritty limelike lumps varying from the size of a pinhead to that of a walnut. The presence of these healed tubercles proves that nearly three-fourths of the population have at some time in their lives had the disease in an active form without knowing it. They were fortunate that their physical condition was so good at the time that they were able to heal the lesion and avoid a serious breakdown. About one person in every hundred, however, is not so fortunate when his infection comes. He is unable to check it and breaks down with a really serious attack. When this occurs, he pays the price in a long, hard fight to regain his health, or else loses both the fight and his life.

As it is estimated that about one per cent of the population of the United States is tubercular,

that means that there are considerably over a million such unfortunates who either have the disease in an active form or have had it in that form, but who now have its activity arrested and have more or less resumed their former ways of living.

Statistics show that the death rate from tuberculosis has been decreasing within recent years. There are no statistics, however, to show whether the number of tubercular people has increased or decreased. If such statistics were available it is not unlikely they would show an actual increase in the number.

Before the handling of the disease was as well understood as it is now, a goodly percentage of those who became tubercular died. Of late years, however, the methods of handling and taking care of the afflicted ones have been so greatly improved that a constantly increasing number has been able to arrest the progress of the disease and seal it in, so that the death rate from this cause has been constantly falling from year to year.

Because of the fact that the death rate has been

falling, many people who are permanently connected with the handling of the disease or the fight against it, have apparently been lulled into a feeling of false security, and one often hears them say, or sees in print, that the fight is practically won, and we can now turn our attention and energies toward other fields, particularly toward cancer. While I do not care or intend to enter here into a discussion of the need of help for a greater cancer campaign, I want to stress the fact most strongly that the fight against tuberculosis is a long, long way from being won.

While it is true that great strides have been made in its handling, only a comparatively small amount of work has been done toward the most important phase of the campaign, that is, educating people more fully concerning the nature, cause, and care of it. So few people, even among tuberculars themselves, understand fully the things they should know to evade the disease or to heal it when it is contracted, that there is practically an unlimited field for further and continuous work in this direction.

Much has been done and is being done in the way of examining school children for signs of the disease, and in the building of more and better hospitals and sanatoriums for the care of people who have it. Much work has been done along educational lines, but there is still a great deal to be accomplished.

I have used the phrase "seal it in" in connection with the healing process. This phrase is used deliberately. It is not correct to speak of "healing" or "curing" tuberculosis, as it is doubtful if there is any such thing as really "healing" or "curing" it in the sense that the germs are destroyed and the disease totally eliminated from the body. The body kills off immense numbers of the germs and then builds up protective walls of hard fibrous or scar tissue and minerals, mostly calcium (lime), around the diseased spots, and in this manner seals the germs into a sort of capsule in which they cease to work, and so the disease is called "healed." "Quiescent" or "arrested" are more accurate terms to be used in connection with a so-called cure, and in fact these are the terms quite generally employed.

After the body has built up such a protective wall, has sealed in the germs that are not destroyed outright, and has replaced as much as possible of the destroyed tissue with scar, the germs so enclosed do not die and lose their trouble-making power. They simply enter an apparently dormant state, and seem to remain alive almost indefinitely.

For this reason they are always dangerous and are always right at the door of the victim like a hungry wolf, waiting for the door to be left ajar so they may again enter and continue their destructive feast.

This phase of the disease is the least generally understood yet is the most vital of them all, and the one the ignorance of which causes more second and succeeding breakdowns and consequent misery than all of the other causes put together.

At this point the question might naturally be asked, if the body has sealed the diseased spots in and walled them up, how the germs can break out of their prison and become active again. The answer is this—the body is an inveterate robber. It will rob Peter to pay Paul. If some weakness

occurs in the body from any cause and building material which is needed at some other point or possibly all over the body is not furnished fast enough through the natural channel—that is from the food passing through the digestive tract —material already built into the protective walls around the live but quiescent tubercles may be taken to fill the requirements in some other part of the body and so make an opening for the imprisoned germs to get out and again cause serious trouble.

If there is any doubt about the body robbing material as described above, note what sometimes happens to a pregnant woman who loses her teeth or has them so softened and damaged that they have to come out. She is unable to furnish the bone-building material, calcium, which the growing child within her requires, and Nature responds by robbing lime from the teeth of the mother to fill the need.

An interesting phenomenon in connection with the healing of lung or pulmonary tuberculosis by the method previously described (fibrosis, or the building up of a protective wall

around the infected spot), is the formation of lumps of hard calcareous matter. These are called "lung stones" and are sometimes expelled while coughing even after healing has been completed. These stones may be as small as a pinhead or as large as the end of a thumb. They are a good illustration of the marvelous processes of nature.

There is much argument in cases of a second or subsequent breakdown, as to whether the second attack occurs as just described, or whether it is due to a new infection. It would seem that the "robbery" theory is the most logical, as it hardly seems probable that once a sufficient resistance has been built up to conquer the disease the body would ever lack sufficient resisting powers to combat the germs that are ordinarily taken in by nearly every one who comes into more or less frequent contact with his fellow men.

The length of time tubercular germs will retain their life and vitality is not known exactly, but it is apparently a very long time. In a laboratory experiment some tubes containing germs

which had been sealed up for thirty years were opened, and it was found that they were still alive and as dangerous as ever. It is apparent from this that once a person has had the disease and sealed it in, or arrested its progress, the danger of a recurrence is ever afterward present. Experience proves that a considerable number of people break down with it again after having conquered it one or more times.

Right here it is well to stress the thoroughly proved fact that each time a breakdown comes it is harder to combat. If repeated often enough a time finally comes when it is no longer possible to conquer it at all.

Recovering from second and subsequent attacks is somewhat like trying to repair a broken levee during a violent flood. Because of the flood it is impossible to do a good repairing job, so the gap is patched up as well as possible. When other breaks come at the weakened spot, it is necessary to keep on patching to hold the waters back until the flood subsides. If enough breaks come, the weak spot becomes a piece of patch work, and may get so bad that it is impos-

sible to repair it any longer, and the flood finally bursts through.

So it is with tubercular lesions. Each time the protective walls are damaged they become harder to mend, until a time will come when repairs can no longer be made and the flood breaks through.

There is a way to avoid most of these accidents whether they be the first or later ones, and it is the purpose of this book to point out that way.

CHAPTER IV

THE SYMPTOMS

It is of the utmost importance that tuberculosis be discovered early and steps taken at once to check it.

More tragedies have been caused and more lives wrecked or lost through failure to recognize the disease in its early stages, than from anything else in connection with it.

The average physician who does a general practice, whether he be a city or a small town or country doctor, does not often have a thorough understanding of the disease and he may be unable to detect it in an early stage, and before it has had a chance to get a good start. When it is discovered early, it is usually most responsive to proper and prompt treatment, but let it once get definitely established and it is one of the most stubborn diseases with which humanity is afflicted. To use a homely illustration, it is very

much like a fire in a haystack. If found quickly it is easily put out, but once well under way it is mighty hard to put it out, and may completely destroy the stack. So in the case of tuberculosis, one must avoid letting it get a start, if possible, and begin treatment at the earliest possible date.

One of the first and most frequent causes of tuberculosis, or the weakness that later leads to it, is malnutrition in childhood.

If the parents are either one or both in poor health or rundown and weakened conditions at the time of conception it is quite apt to result in a puny or weak child. This is especially true if the mother remains in poor physical condition during the time she is carrying the child. If either one or both of the parents are tubercular the chances of a weakened offspring are just that much greater.

Malnutrition of the child can occur while it is being carried and formed by the mother just as well as after birth. This is an important point that has never been stressed strongly enough and it seems to be one of the most vital in the whole

question of how the disease is originally acquired and how best to combat it.

The first danger signal then, or call it a symptom if you wish, may show up before the birth of the child in a weakness of the parents which will cause a weakened or improperly nourished child. Even this handicap can be overcome, as will be explained later.

This is cited as a possible first danger signal or symptom, inasmuch as we have wished to start at the very beginning.

The next place to look for symptoms must, of course, be with the child itself from the time it is born. If the child is puny and poorly nourished and if, shortly after birth, it begins to show signs of rickets or malnutrition, then you have the first symptom in the child itself of a condition that may lead to tuberculosis.

Rickets manifests itself in the improper development of the child. The child shows a tendency to be skinny, with the ribs showing instead of being plump and well fleshed. It gets "pot bellied" and its legs and arms, instead of being plump and well rounded, are thin and

may show signs of deformity. The legs may become bowed, and the soles of the feet show too much of a tendency to turn in. It may develop what is known as "pigeon chest," that is, the chest becomes V shaped. At this time X-ray pictures may show that the bones are not being properly formed. Later a method of preventing and correcting rickets will be given, but in this chapter we wish to deal with symptoms only.

In spite of the danger of weak parents, or a weak, undernourished childhood, let it be understood that not all tuberculosis comes from these conditions. Neither do they always result in tuberculosis. There are plenty of people who become tubercular though their parents were strong, vigorous people with no history of tuberculosis on either side. Unless corrected, however, they are the forerunners of, and the first indication of a condition that may lead to tuberculosis in others.

Susceptibility to tuberculosis is quite generally believed to be due in a greater or less degree to the lack of calcium in the physical make-up,

either because an insufficient amount is taken in, or because its assimilation is faulty. As it is positively known that rickets is due to this cause, it is easy to see the relation that rickets bears to the contraction of tuberculosis.

An outline has now been given of the causes that may occur in the parents before the conception of the child, in the mother during pregnancy, and in the child itself during its early life, that may and often do lead to tuberculosis. This series of conditions, then, may rightfully be termed symptom number one.

Even if a child is not afflicted with rickets it may contract tuberculosis. Danger signs are flying when a child is undernourished from any cause and underweight for its age; when it catches cold easily or colds hang on for an undue length of time; when there is a chronically running ear, or chronic catarrh in the nasal and throat passages.

If a child is nervous, restless, has a poor or finicky appetite, or if after passing the kindergarten age, he is overprecocious—these may all be signs of slight toxic poisoning from the dis-

ease. Persistent cough is, of course, the surest symptom of chest trouble, and tuberculosis of the bones, glands, or other parts of the body will be revealed by either an inflammation, swelling, or discharging ulcers that cannot easily be mistaken.

Should any of these symptoms be present, no time should be lost in getting the child to a competent physician. So many cases of improper diagnosis of the trouble come to light that the necessity of seeking out and consulting physicians experienced in the detection and handling of the disease cannot be overstressed.

Because of the spread of knowledge and the growth of facilities for handling it within the last few years, nearly every one in the United States is now within easy reach of experienced physicians. Cases are known where bone tuberculosis has been diagnosed and treated in its early stages as typhoid fever. One case that came to light not long ago was of a man who complained of rheumatism in his shoulder. Fortunately his doctor was wise to the ways of tuberculosis and after a careful examination found a

tubercular infection in the upper tip of his lung. The inflammation had communicated itself to the pleura and had set up an inflammation in the muscles of the shoulder. This man was fortunate in that he put himself into experienced hands at once. His trouble was caught in its incipiency and by getting the proper treatment early he was saved from a serious breakdown.

There are no sensory nerves to give a sensation of pain in the lung proper, and for this reason the lungs could be nearly destroyed by disease without causing pain. Disease in the lung tissue does, however, set up the same inflammation that it does in other parts of the body, and this inflammation is generally communicated to either the pleura, a tough membrane lining the chest, or the diaphragm. The latter is a flat muscular membrane that separates the chest cavity from the abdominal or central portion of the body, and also acts as an aid in breathing. Through these membranes the inflammation is made manifest by pains and soreness, which, if properly diagnosed, will lead to the real seat of the trouble. Such pains, while

not always indicative of a tubercular infection, are always danger signals and should not be neglected.

We have now outlined the possible foundation of rickets and tuberculosis from the parents through conception, pregnancy, and the early years of the child, also some of the dangers of wrong diagnosis and treatment, and so have paved the way to enumerate the symptoms by which tuberculous infections may be detected when they first occur.

First attacks or incipient cases of tuberculosis almost without exception respond to proper treatment much more readily and quickly than second and subsequent attacks. While first attacks may be corrected within a short time, say a few months, second and later attacks are usually stubborn and long drawn out, and in many cases, we regret to say, attempts to heal them are without result. It is again a case of the fire in the haystack. If caught early one has a good chance of putting it out, but if allowed to get a good start, or a second start, a hard, and, many times, a losing fight will follow.

Outside of the childhood symptoms already outlined which come from a condition of malnutrition, milk or food infections, or from any other cause, the symptoms of the disease after the age of ten or twelve years has been passed are quite another matter. In childhood and early youth, and in fact at any time through life, tubercular infections of parts of the body other than the lungs will usually make themselves quickly known. The more important symptoms are the obscure and unusual ones that ordinarily do not arouse suspicion, such as a tendency to tire easily, lack of energy, or, to use the modern term, "pep"; to be able to work or play for a while with zest and energy, then to have a dragging and tired feeling; gradual loss of strength; failure to become rested after the usual time in bed and the resulting wish for further rest. A well regulated and healthy person after a good rest should be ready and willing to be up and going again, but the poison from tuberculosis pulls one down and makes him feel draggy and heavy. It is Nature's way of telling him that more rest is needed and at this stage rest is just

what really is needed. The patient should rest until Nature has had a chance to conquer and repel the hosts of invading enemy soldiers in the form of tubercular germs which are striving to get a foothold in the system. The one and only cure for this condition is rest. Not rest for a day or a few days but for weeks and probably months until the body has had ample time to regain full strength.

One of the gravest dangers of the disease is due to the fact that in many cases after a short period of rest the patient feels much better and discontinues the treatment too soon. When this is done the tiring and dragging symptoms soon reappear. The only safe course to pursue, when possible, is to take a good long period of complete relaxation and rest.

Other possible symptoms are nervousness, restless and broken sleep. The restlessness and broken sleep are not exclusive symptoms of tuberculosis, but often occur when a person is coming down with a cold, influenza, or some other temporary disorder. If, however, this condition persists for a considerable period of time it is a

warning signal that there is some deep-seated trouble, possibly tuberculosis.

Loss of weight is another indication that things are not going as they should. This, like some other signs, is not an exclusive symptom of tuberculosis, but when taken into consideration with other facts is a help in proper diagnosis.

With the loss in weight there is usually poor digestion and gas in the digestive organs. These are not exclusive symptoms of tuberculosis, but just danger signals that line the way.

Night sweats are an indication that there is poison in the system and the body is making an effort to get rid of it through the pores of the skin. Like other symptoms just enumerated, night sweats often occur when there is no tuberculosis present, but when these sweats are persistent, they, like other things, are danger signals. During the fever stage of the disease, periods of sweating both night and day are very common and while they are weakening, especially if they persist too long, they may aid in eliminating the poisons of the disease.

In many cases people who break down with

tuberculosis will recall that they have perspired easily. This too is a symptom, not exclusively of tuberculosis, but one to be considered and given weight along with the others.

Pleurisy, a most painful and distressing ailment when severe, almost invariably accompanies pulmonary tuberculosis. It may be slight or severe, depending upon the seriousness of the infection, also depending upon the location of the infection. If the infection is well toward the inner part of the lungs the inflammation may not reach the outer portions, consequently there will be no pleurisy, but if the infection is close enough to the outside so the inflammation can reach the pleura it will set up a sympathetic inflammation that is often very painful. At times in an acute case the pain is so sudden and intense that it can be likened to nothing else than the sensation one could expect to experience if his chest were suddenly pierced with a red-hot iron bar. Many people have pleurisy that do not have tuberculosis. They may get it from a bad cold or from exposure. This, however, like other symptoms just mentioned, while not peculiar to tubercu-

losis, is, when considered in connection with other things, another one of the danger signals.

When pleurisy occurs and persists for some time it is quite likely to cause adhesions; that is, the covering of the lung grows fast to the pleura, as a result of which the lung cannot move freely in the chest cavity as it should when one moves about. The result is that one feels either pain or a heavy, pulling sensation in the chest.

Sometimes after considerable healing takes place these adhesions pull loose, a very painful procedure. They are also pulled loose at times when gas or air (artificial pneumothorax) is administered. This operation or treatment will be explained later.

A result of long-continued pleurisy will be the thickening of the pleura due to the chronic inflammation. When there is an inflammation and thickening of the pleura, it in time loses the secretions that keep it lubricated and working smoothly as in health. This causes a grating as the lung moves, and is a cause of pain. Often during the process of healing, the grating can be

plainly felt. At this stage it may not be painful, but is, of course, irritating.

The normal temperature of the human body in health is ninety-eight and six-tenths degrees Fahrenheit. This temperature was established after ten thousand temperature tests had been made upon normal people.

Almost every one has had his temperature taken by a doctor or a nurse at some time in his life, and so is familiar with the method. For those who have not had this experience an explanation will be in order. A small glass clinical thermometer about four inches in length is inserted beneath the tongue, and the lips closed. These thermometers are generally made to register in one minute and will usually do so, except when one has been out in the cold air, or has just taken a cold drink, either of which will cool the mouth, so that a longer time is required to secure the correct temperature.

Another method of taking human temperature is to insert a thermometer in the rectum. The thermometer for this purpose is slightly different from the mouth thermometer in that it has

a round and thicker bulb at the lower end to avoid the possibility of breaking. A mouth thermometer should never be used to take rectal temperature on account of the thinness of the bulb, which breaks easily, and might cause injury from the splintered glass.

Rectal temperatures are about one degree higher than those taken by mouth, and are more nearly the correct bodily temperatures. The mouth is always being cooled to a greater or less extent by contact with the air. The extent of this cooling is, of course, dependent upon the atmospheric temperature.

In some cases temperature is taken by placing the thermometer under the arm, but this method is unreliable and not used when mouth or rectal temperatures can be obtained.

In hospital and sanatorium treatment of tuberculosis both mouth and rectal temperatures are taken.

The object in explaining so fully the taking of bodily temperature at this point is that it is extremely important as a symptom, of use in the proper diagnosis and handling of tuberculosis.

When the symptoms that have already been enumerated are noted, fever or bodily temperature above the normal of ninety-eight and six-tenths degrees may or may not be noted. If the disease is allowed to take its course, however, and nothing done to check it, fever may be counted upon to make an appearance sooner or later in the great majority of cases. While it is not uncommon for people to have fever from a variety of causes other than tuberculosis, such as colds, influenza, or in fact a host of bodily disturbances, these fevers are, as a rule, of short duration. Tubercular fever has some peculiarities that act as symptoms or guideposts in proper location and diagnosis. It is an intermittent fever; that is, it is not steady throughout the twenty-four hours, but comes and goes. Its usual procedure is to come up in the afternoon or evening and subside in the late evening. Tubercular temperatures are also stubborn and persistent, having a tendency to grow worse instead of better unless steps are taken to relieve them. The step to be taken is protracted rest.

Indications of fever are flushed face, hot fore-

head, and a general sensation of heat, lassitude, and discomfort. Not all cases of incipient tuberculosis develop fever, but when a stubborn fever, no matter how slight, does show up, persists, makes one feel dragged out, robs him of energy, and the will to be up and doing, it is another of Nature's warnings or danger signals. It is an indication that trouble is brewing, and that one needs just what his feelings at this time lead him to believe he needs, that is, rest—rest and more rest. This is the only thing that will remedy the trouble. Many people with bad tubercular infections do not have fever, so the disease may be present without this symptom showing up, but when it does it should be considered along with other symptoms.

A tubercular infection of the lungs is usually but not always accompanied by a cough, more or less severe, which hangs on. Sometimes pus is raised and sometimes not. Even a small amount of pus is an indication of trouble. When pus is raised and the general symptoms point to tuberculosis, no time should be lost in having a sample analyzed by a competent and experienced

doctor or bacteriologist to see just what germs are present. The fact that there may be no tubercular germs present should not lull one into a feeling of false security, as it very frequently happens that even in well-advanced cases of long standing it may be impossible to find the germs.

In patients with no cough the trouble seems to be hidden away and the poisons are absorbed instead of being thrown out through the agency of the discharged sputum. These cases are usually more stubborn even than the average, which is stubborn enough as all will admit who have ever had anything to do with one. As long as the poisonous pus is being generated it is best to have it come up.

Any stubborn cough that hangs on and persists should be regarded with suspicion, and it should be studied before it has gone too far.

May people who become tubercular catch cold easily and their colds often hang on for an undue length of time. This is an indication that an unhealthy condition exists and is one more symptom added to the list.

Many cases of pulmonary tuberculosis are pre-

ceded by, or accompanied by, some sort of throat trouble. The first signs of this are dryness and tickling followed by an inflammation which will not respond to any of the old and tried methods of treatment. It, like everything else in connection with the disease, becomes chronic and hangs on, usually growing worse as the disease progresses. In many cases it develops into a tubercular throat, an extremely painful and serious complication. There will be no mistaking a tubercular throat when it comes, as it will be ulcerated and a source of great pain and distress. In severe cases the disease damages or entirely destroys the vocal cords, so that the voice is permanently damaged or lost entirely.

Inflammation or ulceration of the throat, then, which will not respond to the usual treatment and which becomes stubborn and chronic, is another of the danger signals and symptoms indicating that tuberculosis is probably present.

It will often happen in cases of throat inflammation that the physician or throat specialist will diagnose the trouble as diseased or infected tonsils and recommend their removal. Great

caution should be exercised in removing the tonsils from the throat of a tubercular person and it should be done only upon the advice of a tuberculosis specialist after he has had an opportunity to consider all of the facts and symptoms. Inestimable damage has been done by the removal of tonsils when it was not justified. Especially is this true when a general anesthetic is used; that is, ether, chloroform, or gas. Occasionally it is very urgent that the tonsils be removed.

In many cases of tuberculosis the first warning the victim has is the coughing up of blood or a severe hemorrhage. Sometimes there are no preliminary symptoms whatever and the bleeding comes to frighten and distress one like a bolt of lightning from a clear sky. Bleeding or hemorrhage from the lungs is, of course, such a flagrant and shocking thing to the one who first experiences it that there is no mistaking it as a symptom. Not all cases of pulmonary tuberculosis result in hemorrhage, yet this may be the most prominent and sometimes about the only symptom.

Hemorrhage is always dangerous and no chances should be taken with it, as one never knows from what part of the chest it may be coming. The trouble may be in either a large or a small blood vessel. When the hemorrhage is from a good-sized blood vessel, the loss of blood may be very great and death sometimes follows within a few minutes. In other cases it may take several hours for the bleeding to result in death.

One should not become panicky or discouraged over hemorrhages. I, personally, have known hundreds of people who have had them and have regained their health. A considerable percentage of cases have more or less hemorrhage at some time during their sickness and before their lesions become sufficiently healed to prevent. Many patients have had dozens of them; often one after the other, sometimes scattered over a period of several years. Most cases recover quickly from the effects even when the loss is great. The human body is a marvelous machine and its recuperative and blood-making powers are often beyond belief.

When hemorrhage occurs in a person apparently in good health and with no other warning, the danger is sometimes not fully realized and there is often a tendency to continue the usual mode of life. This is a great mistake. No time should be lost in securing competent medical advice and starting the relaxation and rest that alone will give the body a chance to heal.

It often occurs when a person has a bad cold that stains of blood may be noted in the sputum. They may come from an inflamed throat or the mouth. One need not become alarmed over a drop of blood, but when it becomes plainly evident that bleeding is really coming from the lungs no time should be lost in locating its source and determining its cause. The proper procedure when a hemorrhage of any severity occurs is to have the patient lay down on his back, and remain quiet. A physician should be summoned at once.

We may then add another to the list of symptoms which indicate a tubercular infection. When the coughing up of blood or real hemorrhage occurs it is a safe assumption that some-

where in the chest the germs of the disease have found lodgment and started their destructive work.

Bronchitis is another form of chest disorder. When this occurs it means that some sort of disease germs have attacked the mucous membrane lining the bronchial tubes, embedded themselves, and set up an irritation. The method of attack and healing here is very much the same as in the lung tissue proper. Nature makes the same effort to segregate and wall off the diseased spot. However, as the tissues involved differ somewhat in character, the process is not exactly the same.

Whenever one has any undue inflammation in the chest or bronchial tubes due to a cold or exposure or to a tubercular or other infection, the inflammation finds the embedded germs awaiting a favorable opportunity to break out of prison and cause trouble.

Many authorities are of the opinion that bronchitis is a trouble distinct and separate from any other disorder, but most tuberculosis specialists believe that chronic bronchitis commonly has a

tubercular base. Some doctors who have been handling tuberculosis for years claim never to have known a clear case of bronchitis; that is, one without an accompanying tubercular infection in the lungs.

The bronchial tubes are lined with a peculiar form of mucous membrane, the surface of which is covered with tiny hairlike projections called "cilia" which constantly move any foreign matter in the tubes upward so it may be discharged from the mouth. Dirt, dust, mucous, and pus from lung lesions are in this way being constantly carried upward. Where streams of disease germs are constantly passing over the membranes lining the tubes, some of them are likely to find permanent lodgment and set up a new infection.

It is well to remember this and not be lulled into a feeling of false security when told by a doctor that one has only a bronchitis. After a diagnosis of a chronic bronchitis the best thing to do is to get oneself into the hands of a tubercular specialist as soon as possible and have the real seat of the trouble located.

Let us, then, consider a chronic bronchitis as another of the symptoms and danger signals pointing the way to a recognition of a tubercular infection.

Clubbed fingers, that is, enlarged finger ends and finger nails turning down like a parrot's beak, and ribbed finger nails, are other indications, although they are more results than they are symptoms. The reason for it is found in the poor blood circulation in the ends of the fingers and toes. Here one set of blood vessels, the arteries, carrying the fresh, new blood from the heart and lungs ends and another set, the veins, carrying the vitiated blood back to be purified, start. In between them is a set of very fine blood vessels, the capillaries. Owing to the sort of dead-end condition that exists, there is a tendency to stagnation and a settlement of poisons which causes the building up of excess tissue for protective purposes, producing enlarged or clubbed ends.

Clubbed finger ends are not an exclusive symptom of tuberculosis, as they sometimes occur in certain forms of heart trouble.

CHAPTER V

THE TREATMENT

THIS book is not written or intended as a scientific outline of the diagnosis and handling of tuberculosis, but rather as a common-sense method of detecting and guarding against it, and to give some good, homely advice on what to do if you find yourself afflicted with it. There is nothing in the entire book that is intended to take the place of the advice and care of competent physicians and nurses experienced in the handling of the disease.

The handling of tuberculosis is just as much of a specialty as is any other branch of medicine and surgery, and it is debatable, if it isn't really, the greatest specialty of them all.

Scarcely any two cases of the disease are alike. Practically every individual case is a study in itself. There are, of course, certain general principles that govern its handling, but probably no

human ailment presents so many variations and different angles. This is the reason why experience is such a large factor in its care. There is nothing that will take its place.

Granted, then, that one has noted symptoms that lead him to believe the disease is present, the first step is to make careful inquiry for the right doctor. In case he is not at hand, and one is financially able to do so, it is best to travel far enough to get in touch with the right one.

After the examination has been made, and if tuberculosis is present, the next thing to do is to conquer fear. It is doubtful if anything else, unless it be leprosy or cancer, can inspire the fear and depression that the average person feels when first told that he is a victim of tuberculosis.

Bad as it is, however, one must learn, as the first step in the fight, to throw off fear and just as quickly as possible get himself into a cheerful and optimistic frame of mind. Such a state of mind is a desirable thing at any time, but it is a vital necessity in the fight against tuberculosis. So much of a necessity, indeed, that it usually proves to be the deciding factor. People of a

cheerful disposition stand a much better chance of recovery than those of a dark and pessimistic turn.

There is a vital connection between the mind and the state of health, and nowhere is it more in evidence than in tuberculosis.

Let the first step in the cure, then, be the schooling of one's self to overcome fear and cultivate optimism and cheerfulness.

This can be done, and is done, to such an extent that tuberculosis is sometimes called the cheerful ailment, and sanatoriums devoted to the care of tubercular people are as a general rule surprisingly cheerful places, and the occupants are a happy-go-lucky company.

Medicines and drugs play their part in treating the disease only as helpful aids and in treating complications. There is no medicinal cure for it.

Surgery also plays a part, as will be further explained in a later chapter.

Various other aids are used, such as sunlight, both natural and artificial, but the principal time-tried and proven treatment is the rest cure,

which consists of either complete or partial rest, usually in bed. Judicious diet, and, at the proper time, graduated exercise, are also of great value.

Physicians are prone to recommend either a change of climate to some distant part of the country, or else the entering of some expensive sanatorium, without considering the financial condition and prospects of the victim. Too often the finances are so limited that expensive trips and high-priced sanatoriums are out of the question.

Tuberculosis should be a rich man's disease, but unfortunately people in poor or modest circumstances get it more commonly. It should be a rich man's disease because of its long duration and the condition in which it so frequently leaves its victims.

In case one does go to a sanatorium the first step upon arrival is to be checked in; that is, assigned to quarters, whether it be a private room or a bed in a ward where there are other patients; get belongings settled; have records taken for the office, and in general to be made as comfortable as possible. After the patient has had

time to get settled and become used to the surroundings, a doctor makes a thorough examination. This should include various blood, urine, and sputum tests, and X-ray pictures or examination with the fluoroscope, or both where needed. Large hospitals and sanatoriums have technicians on their staff who look after the making of tests and the taking of X-ray pictures. Nurses and other attendants see to the taking of temperature and pulse.

After all data necessary have been assembled the doctor will prescribe the routine the patient is to follow.

In cases with considerable trouble and fever, complete rest in bed will in all probability be prescribed. This complete rest will be continued until the patient's condition is sufficiently mended to permit of his either sitting or getting up and moving around. The doctor will decide this in accordance with the general condition and progress of the patient.

Various medications will also be prescribed as needed from time to time. It is impossible to give any outline of the medication, as doctors

must be guided in this matter by many factors. In any event, as previously pointed out, it is not the intention to prescribe the technique of the cure, but rather to give a general outline of the disease and the methods to be followed in getting into competent hands at the right time, and to point out some of the common errors to be avoided.

People who find themselves afflicted with tuberculosis are urged to place themselves in the care of experienced people just as quickly as possible, and to pay no attention to generally well meaning but often mistaken people who urge various kinds and sorts of treatment. They must not lose sight of the fact that but one treatment is known so far, and that is the rest cure.

Any delay in getting treatment started is dangerous and may mean the difference between winning or losing the fight.

There is usually a tendency to put it off and hope that one will get to feeling better by and by. This is especially true if one's financial circumstances are not good. It is better to make any

sacrifice that may be necessary right at the start, even to an appeal to charity or the public authorities, rather than to wait until the disease has gained further headway, and possibly caused irreparable damage to the body. Most people's pride prevents appeal to charity or to public help until their condition becomes desperate. Tuberculosis is a disease that humbles pride, and unless treated in time will force the proudest to seek help. Better, then, to humble false pride at the start, and to save time and suffering.

For those who wish to take the treatment at home and have had no previous experience a few simple rules will be given.

The first rule, as previously stated, is that it is best to get into the hands of experienced people as quickly as possible.

In case it is not possible or considered desirable for the patient to spend his entire illness in a sanatorium, it is strongly urged that he spend at least a few weeks in such an institution until he learns the proper routine and care of himself. For those who can afford a nurse for the home care, they should by all means try to secure the

services of one who has had previous experience with tubercular people.

In case none of these things may be done and it is necessary to take care of the patient in the home, he should be put to bed either on a sleeping porch or in a comfortable, well-ventilated room with exposure to the east, south, or west, but not in a room which has only a northern exposure.

In cold weather the room should be kept comfortably heated but not hot, and in really cold weather it is best not to keep the patient on a sleeping porch when it is at all possible to have him inside. When the temperature gets much below freezing, or thirty-two degrees above zero, the sick person is better off inside where it is warm and comfortable. The room in which he is confined should at all times have windows open so that there will be a circulation of fresh air.

The old theory that it was necessary to have the patient out in the open air all the time, and the colder the air the better, has been quite generally discarded, and it has been found that any

well-sunned and well-ventilated room is satisfactory, providing it is not too noisy, or in a location where the air is fouled and the sun obscured by smoke, dirt, or poisonous gases.

There are still a number of people who have had long experience with the disease who stick to the old theory that the colder the air the better. This kind even frown on any heat.

After a long experience I do not subscribe to this theory, and am of the firm conviction that warm, pure air is just as beneficial and just as healing as cold air and it is a great deal more comfortable.

The requirement that people who are sick and feverish and who have raw lungs and lowered vitality live and sleep in the open air in zero or sub-zero temperature seems to necessitate the using up of energy and vitality to fight the cold that should be expended in fighting the disease. Then, too, extremely cold weather requires such heavy covering that it makes one uncomfortable from its sheer weight. The author well remembers a most uncomfortable experience of his own in sleeping on an open porch when the thermom-

eter registered thirty-two degrees below zero. It required so many covers that the effort to turn over left one exhausted and panting for breath for some time. Then, too, the sensation of this extremely cold air being taken into an already badly inflamed chest was certainly not one of healing, but rather of irritation.

The claim is often made, and by people who should know better, that such extreme cold helps to kill off the germs. Such a claim is not borne out by the well-known fact that the germs will stand freezing for an indefinite length of time without destruction. How, then, can it be claimed that the extreme cold is detrimental to the germs and beneficial to the patient?

Sleeping on an open porch or even in an unwarmed room in sub-zero weather is a trying experience even for well people whose vitality is up to normal.

It may, then, be considered that if the patient is kept in a well-ventilated and sunny room he will be more comfortable and will progress just as fast and probably faster if the room is kept reasonably warm, that is, at a temperature

around sixty degrees, than if no heat were provided.

In caring for the sick one at home provision should be made for taking care of the sputum. The patient should be careful always to cover the mouth and nose when coughing or sneezing, as droplets of moisture containing germs may be expelled several feet into the air if precaution is not taken. These germs get into the air and are a source of danger to others. Either cotton gauze or soft paper napkins should be used to cover the nose and mouth when coughing or sneezing, and then these should be burned.

Patients should not spit in washbowls or toilets, but should spit either into a paper napkin which should then be folded up and placed in wax-paper-lined heavy paper bags, or else in special sputum cups made of heavy waxed paper. These sputum cups are made up so they can be folded and put in a handy square box holder with a handle like a tin cup or else one may get them already made up to be carried in the pocket. After sacks and sputum cups have been used they should be promptly burned, and never

thrown into wastepaper baskets or otherwise allowed to lie around. Suitable napkins, bags, and sputum cups can be obtained at drug stores. In case they do not carry them in stock, druggists can order them from their catalogs, as they are now regular articles of drug-store merchandise. In cities where tuberculosis sanatoriums are located they are usually carried in stock, but may not be in smaller and more isolated places.

It is entirely out of the question to outline here the correct procedure to be followed in a course of home treatment, as there are so many factors to be taken into consideration. One should always, when at all possible, have competent medical advice and be governed by the doctor's orders. He will in turn be governed by the nature and amount of tissue involved in the infection, the patient's age, sex, and general condition, and the complications, such as heart, kidney, bladder, or other trouble that so often accompany the disorder.

As a general proposition, however, it is safe to direct that the patient be kept in bed until blood spitting, if any, ceases, and the fever has gone

down and a normal temperature maintained for from two weeks to a month. The patient may then be permitted to sit up a few minutes each day, gradually increasing it to one hour, then permit a very short walk each day, gradually increasing this as condition permits. If the temperature starts to mount again, the patient should stay in bed until the fever has subsided for a sufficient length of time to make it safe to resume the daily exercise. Care should be used in resuming the exercise and if much time has elapsed the patient should not start in where he left off, but start in at the beginning and gradually work up again.

In some cases tuberculars do not have good resistance and so do not run any fever. In such cases one must be guided by the general condition and the amount of coughing. It should always be borne in mind that, as there are no sensory nerves in the lungs, the disease may be spreading without its being felt. A competent physician can tell by examinations from time to time, whether the trouble is stationary, healing, or spreading.

As the patient grows stronger and improves, the daily exercise may be gradually increased, but as long as the cure is continued one should follow regular routines of rest and exercise, and until just before ready to resume work should make it a point to rest at least thirty minutes before and at least one hour after meals.

During the home treatment a regular time for retiring should be set and rigidly followed. Nine P. M. is late enough to be up.

Dancing, shows, and such forms of amusement should be banned, and the business of getting well strictly followed.

It is hard for young people when they begin to convalesce to forego all forms of amusement, but it is best that they do so, as it is an easy matter to undo the results of months of patient work in resting by a few minutes of injudicious activity.

Tuberculosis is something one cannot trifle with and every setback makes it that much harder to effect a cure.

In home treatment the patient should be isolated from the rest of the family as much as pos-

sible, and especially from the younger members. Children should not be fondled, and for their sake it is best to keep them away from the sick one entirely. No well member of the family should sleep in the same room with the patient.

No hard studying should be done.

The mind should be kept as tranquil as possible, and worry and excitement avoided.

The diet for the home patient should be a good common-sense, well-balanced, and nourishing one containing plenty of meat, milk, and eggs, and fruit and vegetables, both cooked and raw. An excess of pork should be avoided, as it is hard to digest. Good beef is the most suitable meat. As much milk as can be digested should be taken unless one is up to weight or over weight. Milk is the best building food for sick and run-down people. Care should be taken to see that it is pure and free from tubercular infection. Pasteurized or certified milk is best where it can be obtained. The milk from Jersey cows is not recommended, as it is too rich in butter fat, and the butter fat particles are too large

to be easily digested. Milk can be taken with meals and when necessary taken in the middle of the forenoon, middle of the afternoon, and at bedtime. A small amount of candy and pastry is all right, but too much should be avoided.

When there are stomach, kidney, or other complications, a correct diet should be prescribed by a physician familiar with the case. Such diet instructions should be carefully followed.

Some Hints for Self-Help

As has already been pointed out in this chapter, tuberculosis is a disease that requires both experienced doctors and experienced nurses for proper handling. A tubercular person may, however, have the very best medical and nursing attention and the best of surroundings, and yet if he fails to do his part the best care and supervision in the world will not bring about a cure. The patient must steadily and consistently "chase the cure" himself. By steadily and consistently I do not mean for a few weeks or a few months, but all during sickness and convalescence, and

in fact during the balance of his lifetime he must be careful and consistent. It does not do any good to follow the prescribed routine of rest or mixed rest and exercise, as the case may be, for a day, a week, or a month or longer, then strike out all of a sudden and do something unusual and out of the routine, such as riding horseback, taking a long and tiresome walk, a shopping tour, automobile trip, going to a dance or theater, or any such like activity. By so doing one is very likely, especially if he has much involvement, to undo in a few hours of indiscretion all the good that has been done during a long period of curing.

The fibrous or scar tissue that is built up around the tuberculous lesions is at first very soft, and easily ruptured, so that unless it is given time to toughen it can easily be torn down and destroyed. After this has been done it is much harder for the body to build it up again, as there are no blood vessels or blood passages built into the new tissue. Consequently, when it is broken down, the repair forces of the body are faced first with the task of absorbing the devitalized

scar tissue before any further repairs can be begun. It will be found that the process of building up broken-down scar tissue is a harder and slower process than the original building of it, and each time it is broken down it will be an increasingly long drawn out and difficult task to heal again. If the process should be repeated several times, it will probably be found it can no longer be repaired, and the fight will be lost. When tempted to indiscretion one should ask himself whether it is worth the price.

For the reasons just set forth it is extremely important that all those afflicted with tuberculosis follow closely the prescribed course of treatment and forget about their pleasures until the healing process is well enough along for it to be safe for them to indulge in some manner of recreation and amusement.

The things that people afflicted with tuberculosis can do to help themselves not only to a "cure," but also to some measure of readjustment and rehabilitation when they return to an active life are: To avoid panic or fear when they first find they have the disease, and to face the issue

bravely; to get themselves into the right hands and get the cure started as quickly as possible.

When they do start the cure, either in a home or a sanatorium under the care of skilled and experienced people, let them coöperate closely with their doctor and nurse. If not under medical and nursing care they can follow the outline for home care already given in this chapter, but I want to emphasize again the importance of having experienced medical attention when at all possible.

They should keep cheerful and optimistic and not permit themselves to become selfish, gloomy, and grouchy and hard to get along with. It should always be remembered that other members of the family, if at home, or the attendants, if in a hospital or sanatorium, have rights and feelings, and that the world does not stop simply because some one is sick. It should also be remembered that it is bad enough to have a sick person around even under the best of conditions, but when they are peevish, faultfinding, and hard to get along with, they are at times almost intolerable to well people, especially people who have themselves never had any serious illness.

It is best to keep as tranquil as possible and avoid anger and excitement, or any undue stirring of the emotions.

Exciting reading matter should be avoided.

Any form of gambling is taboo, as the excitement speeds up the heart, and if the patient is still subject to fever it will probably cause a rise in temperature.

The patient should keep out of overheated rooms during sickness and convalescence, and in fact always thereafter. He must also avoid, when possible, exercise or work that will cause one to become heated and to perspire heavily. Staying too long in overheated places, or bodily activity that causes heavy sweating, seems to activate the dormant germs and will often cause either a flare-up or start one to coughing, and with hemorrhage cases a hemorrhage may be brought on.

The convalescent patient should not go to theaters or other gathering places at all when the trouble is active, and after being "cured" he should not go too often.

He must not dance or swim or play games such as tennis, baseball, etc., when convalescing,

and be mighty careful about doing these things even after a "cure" is made.

All tuberculars, no matter how much or how little involvment they may have, should follow these rules while their disease is active, during convalescence, and until sufficiently healed to make it safe for them to increase their activities.

After a "cure" one should be governed in his work, amusements, and general activities entirely by the nature and amount of his involvment.

In cases of pulmonary tuberculosis, when the area of involvement is small and the lesions are well healed, one should, with care, be able to lead a normal life. However, when there has been much trouble or a good "cure" was not made, one must be governed accordingly. It is out of the question to lay down any particular set rule. One should learn about his trouble from a competent doctor and then map out his future course.

Large numbers of people who have had serious trouble and have lost a great deal of lung

tissue have still made a good "cure" and have returned to their old activities. Others have studied during their period of sickness and convalescence, and have fitted themselves for other and more suitable occupations than they had previously.

A good thing to remember is that Nature is a lavish provider in many ways. She has given us two eyes and two ears when one of each would do, and likewise she has given us two each of other organs when one would have been sufficient. Among the organs that have been given us in pairs are the lungs. We have two, but can get along nicely with one, or even less, so one shouldn't be discouraged if he has lost considerable lung tissue. If one gets a good job of "healing" he can get along and make considerable of a success in some line, even if he has less than the equivalent of one lung left. Artificial pneumothorax, as explained in the next chapter, will often help get one back on his feet again and keep him going when he does get there.

As a sort of summary of these hints for self-help, let me say that there are no particular

medications to be recommended. During my own twenty-five years' experience with it I have shunned medicines as much as possible, as I have always felt that the disease furnished sufficient poison for the system to handle and eliminate without using drugs to add to the burden. In any event, as stated in the Introduction, I have aimed to avoid any semblance of prescribing. In many cases of tuberculosis there are complications that need medication and almost any case needs a few simple remedies, such as proper physic, tonics, things to check diarrhea and so on, but when at all possible these should always be prescribed by a competent physician familiar with the disease and the particular case. There are so many angles to the disease that it is easy to do the wrong thing. Care should be taken with even such a simple thing as a physic, as the bowels become sensitive during any long sickness, especially tuberculosis, and it is easy to cause an irritation that can easily become chronic.

For the benefit of others I will give a list of the few simple remedies I use myself and have found sufficient:

A light dose of castor oil on the rare occasions when a physic is needed.

A ten grain tablet or capsule of bismuth subnitrate, once to two or three times just after meals to check diarrhea.

A ten per cent solution of tincture of iodine in glycerin, with a small roll of cotton and some wooden applicators to swab the throat when it becomes inflamed.

Any good mouth wash that suits the individual.

Either a tablespoonful of whisky or a small wineglassful of port or sherry wine just before a meal when the need of a tonic is felt.

In addition to the above I believe one should drink some grape juice every day, as it contains mineral salts that are needed to make new blood and repair destroyed tissues.

As a practical means of self-help and rehabilitation one should try to utilize some of his spare time during sickness and convalescence by reading good books and studying some particular thing that appeals to him and that will be of help to him after he has made a "cure." One can get

splendid mail-order courses on almost any subject these days, and every city of any size now has a public library where desired books can be obtained.

The patient must coöperate with the doctor, the nurse, his family, and friends, and follow the "cure."

Above all, he must be consistent. He must not practice the "cure" faithfully for a day, a week, or a month, then go "bumming" and undo all that has been done and perhaps more.

It is hard for many people, but especially for young people who have not had their fling, to forego any and all pleasures and recreations, but they must remember that if they are careful and make a good "cure" they will have plenty of time to enjoy life when they get out again, and living will seem all the sweeter for having been laid up so long. I can say that, at the present time, even after twenty-five years of tuberculosis, I get more satisfaction from living than at any time in my fifty years. It's somewhat like the small boy that always liked to have his mother spank him because it felt so good when she quit.

If one has never been sick he does not fully appreciate good health.

Above all (and this is the most important rule of all for self-help) one must not be pessimistic, grouchy, and hard to get along with. One must try hard to be cheerful, optimistic, good-natured and helpful, and so help himself to get well.

Time and Nature are the healers, but a considerate attitude can help.

CHAPTER VI

THE SURGERY OF TUBERCULOSIS

THE ideal way for tuberculosis to heal is by natural processes; that is, letting Nature do the work, but unfortunately Nature too often requires considerable help. For this reason an extensive surgery has been perfected which is used when conditions justify.

Artificial Pneumothorax or The Gas Treatment

The first and probably most common use of surgery in tuberculosis is that known as "artificial pneumothorax," or the injection of either nitrogen gas or ordinary air into the chest cavity between the pleural lining of the chest wall and the lung proper.

This is accomplished by inserting a hollow needle between the ribs until the pleura is penetrated, then forcing the gas or air into the opening, the idea being to compress the lung as much

as possible and in this way retard its action, the ideal condition being reached when the lung can be completely collapsed or immobilized. If this complete condition cannot be reached, then as much of a collapse as possible is given.

As the chest cavity is divided, it is possible to treat each lung separately.

This operation should be resorted to only after a sufficient time has elapsed to see whether healing can be affected and good progress made without help, and then only when one lung is either entirely free of trouble or so near it that it is considered safe to throw additional work upon it.

When a tubercular infected part of the body, whether it be a lung or any other member, can be thrown either partially or wholly out of service and kept quiet, the healing process is greatly hastened.

The amount of gas or air given at a time varies from many causes, the chief one being the extent and location of adhesions. This is especially true if the adhesions have become so solidly grown that it is impossible to pull them

loose. The capacity varies from a few cubic centimeters to ten or twelve hundred. In some old and chronic cases it is impossible, on account of the adhesions, to get in enough of the gas to be of any use, and it is then necessary to give up the attempt.

Many times when adhesions are comparatively new it is possible to break them loose. This is desirable, but always painful.

The gas is administered as often as conditions require, sometimes every few days; at other times weeks or months may intervene between applications.

The length of time necessary to continue the treatment will also depend upon the patient's condition. Sometimes a few applications will suffice, in other cases it may be necessary to continue them several years, and in cases where a lung is badly shriveled it may be necessary to continue them throughout the balance of the patient's lifetime.

In some cases artificial pneumothorax produces astonishingly good results in a very short time, bringing about a quick drop in tempera-

ture, reduction in the amount of coughing and "raising," greatly facilitating the healing process, and so materially shortening the length of time necessary for a "cure." In other cases the benefits are slow in making an appearance, but do eventually manifest themselves. In still other cases the results are detrimental, and it is necessary to discontinue the treatments entirely.

The principal bad result is the tendency it has in so many cases to cause fluid, or sometimes pus, to form and settle in the chest cavity. When this occurs it is often necessary to drain it off by inserting a hollow needle into the chest wall in the same manner that the insertion is made to administer gas. It is sometimes necessary to drain it off a number of times. If this is clumsily done there is danger of infecting the needle hole, or in extreme cases, spreading the infection through the entire system. In some cases no attempt to drain it off is made, and it is gradually absorbed.

The formation of fluid sometimes causes a rise in temperature, and at other times a partial col-

lapse of the lung. When collapse occurs, the results are beneficial, and very similar to those obtained by the gas pressure.

The operation of administering gas or of removing fluid is neither a particularly difficult nor painful one. It usually causes more suffering from fear and apprehension than from the real operation itself.

Before the needle is inserted an injection of a local anesthetic, cocaine or novocaine, is given with a small hypodermic needle, and this needle prick is about all there is to the pain. Unless the work is handled by skilled and experienced doctors there is danger of puncturing the lung. While this is not an especially serious matter, it causes some damage to lung tissue, and should be avoided.

It is impossible to tell in advance what the results will be. All one can do is try it and see. The percentage of cases benefited is sufficiently high to justify its continuation.

In old chronic cases, when the adhesions are numerous and tightly grown, not much success is attained as a rule by the operation. However,

even in such cases, some remarkable results are attained at times, so that no matter what the status of the case may be there is justification for its trial, if in the opinion of the physician the operation is permissible.

The gas or air injected into the chest by the operation is eventually absorbed, the length of time necessary for the absorption to take place depending upon the amount administered. In some cases, some of the gas or air leaks out through the needle hole, and creeps around under the skin for a considerable distance, causing a puffy swelling which is harmless and soon disappears.

Phrenectomy, or The Nerve Operation

Phrenectomy, or the nerve operation, is used to some extent in cases where, like the procedure for artificial pneumothorax, one lung is either free of trouble or so near it that it is considered safe to put an additional burden upon it.

This is an extremely delicate operation that should be entrusted only to surgeons of skill and experience. It is an operaiton that requires very

little cutting, consequently the shock and after-effects from it are slight.

It consists in making an incision in the skin from two to four inches long on top of the shoulder close to the neck, separating the muscles that lie there, then locating the nerve that runs from the spine, over the shoulder, down the chest, and connects with, and controls, one-half of the diaphragm. After this nerve has been located it is severed, and as much of it as possible, anywhere from two to twelve or fourteen inches, is removed. The amount that can be reached varies with individuals. In an adult this nerve is about twice the size of the lead in an ordinary lead pencil.

The severing and removal of the nerve causes a paralysis of the diaphragm on the side upon which the operation is performed. The result of it is that the diaphragm ceases to function as an aid in breathing and the lung is partially immobilized. The relaxed diaphragm allows abdominal pressure to push the lung upward. Through the lessening of the breathing activity and the compression of the lung, less work is

required of it, thus giving it a better opportunity to heal. The operation, however, throws an added burden upon the other lung.

Good results are often obtained immediately from the operation, there being an immediate drop in temperature, and a lessening of the amount of coughing and raising.

In other cases the good results are slow in appearing, and in still others no good results at all are seen.

The operation requires about twenty minutes when it is performed by a skillful surgeon, and is done with a local anesthetic; that is, the patient is not put to sleep, but an injection of a local anesthetic is made on the shoulder immediately preceding the cutting. No pain is experienced from it.

The bad features of the operation are that the nerve controlling the arm lies close to the nerve that is to be severed, and unless the surgeon knows his business he may sever the wrong one and cause a paralysis of the arm.

There is always the danger, too, that trouble may appear in the well lung after the operation,

and with the added burden it is carrying it would have a lessened chance to heal.

People suffering from tuberculosis will do well to wait a reasonable time after starting the cure to see whether or not healing will take place without artificial help. If good progress is made it is best to let Nature do the work in her own way, but in cases where progress is either too slow or has ceased entirely, one is justified in trying artificial means to assist the healing.

One must be governed in the matter by his condition, progress, the recommendation of his doctor, and by his feelings.

No one can foretell what the results of the operation may be, but the percentage of cases helped is sufficiently high to justify a trial of it when one is going backward, or when progress can be obtained in no other way. It should be remembered that the nerve cannot be restored after it has once been removed.

Thoracoplasty, or the Rib Operation

Thoracoplasty, or the rib operation, is one of the most difficult operations performed by sur-

geons. It should be used only as a last resort in old and chronic cases, and after all other methods of getting the patient started toward recovery have failed, and then only when one lung is in reasonably good condition.

When one seems unable to put up a sufficient fight to tip the balance in the right direction, and the only prospect is one of becoming a chronic invalid, then and then only is one justified in taking the chances necessary in submitting to this operation.

The operation is performed as follows, usually with a local anesthetic: As the shock would be too great to cut all of the ribs at once, the operation is divided into two, three, or four parts, and as each portion of it is performed, several ribs, as many as it is felt the patient can stand, are cut. An incision is made in the back not far from the spine and a section of rib, from one to four inches, removed. It is necessary to spread the several operations over a considerable period, permitting a couple of weeks or more to elapse between each to give the wounds a chance to heal, and the patient an

opportunity to recover and gather new strength for the next one.

After the rib sections have been removed, the chest is compressed, the idea being to squeeze and immobilize the lung as much as possible.

Sometimes if the first series of operations is successful a second series is performed, and another section of the ribs removed, and the chest still further compressed.

The shock from this operation is severe and sometimes causes death.

In some cases no benefit is received. In others the benefits are very marked and show up quickly.

Its weakness lies in the deformity it may create in the chest in event the work is not skillfully performed. This is not as serious as it may sound, however. There is also the possibility of the other lung flaring up, which would, of course, leave one in a very bad condition.

It is recommended only in cases when one would rather take a gamble with death than become a confirmed invalid.

Let me stress strongly the point that the opera-

tion should be entrusted only to surgeons of proved skill in chest surgery. Certainly it is no undertaking for an amateur.

Lobectomy

Lobectomy is a comparatively new operation, used only with pulmonary tuberculosis, and still very much in the experimental stage.

It consists of inserting an electric needle through the chest wall into the lung proper and burning or cauterizing infected areas, the seat of infection having first been located by means of a light inserted in the chest via the bronchial tubes. It is practical only when the infected area is small and compact.

Like the rib operation it is a delicate and dangerous operation, and as yet very few surgeons are competent to attempt it. The mortality from it is extremely high, running around fifty per cent, or one-half, due largely to the excessive hemorrhage which so frequently follows, and which it seems impossible to avoid under present methods.

It is possible that the technique of the opera-

tion may be further perfected so that it will become reasonably safe to use, but in its present unperfected state it cannot be recommended.

Throat Cauterization

In cases of severe throat infection when there are tuberculous ulcers it is sometimes necessary to cauterize or burn them in order to destroy the infection and cause them to heal.

The cauterization is done with an electrically heated instrument, the throat having first been thoroughly anesthetized with cocaine.

There is no pain from the operation itself, but it becomes very painful after the effects of the anesthetic have worn off, and remains sore until healed.

In some cases the vocal cords are either badly damaged or entirely destroyed by the ulcers, leaving the patient voiceless for the rest of his life. However, the cauterization is effective, and about the only real remedy in cases where the ulceration is bad and it becomes necessary quickly to stop the further ravages of the disease.

Sunlight and ultraviolet light rays are some-

times used in throat infections. As throat cauterization is a delicate operation it should, of course, be undertaken only by a specialist.

Bone and Gland Surgery

In cases of general tubercular infections when the glands are infected, and in so bad a state that they will not heal, it is often necessary to remove them entirely. This is done with either a general or partial anesthetic in the manner usually employed for major operations.

In cases of bone tuberculosis, the procedure followed is either scraping or chipping away portions of the diseased bone. This is a serious operation, and it is sometimes necessary to perform it many times before the trouble is completely checked.

Rectal Surgery

One of the most deplorable results of tuberculosis is its tendency to cause infections and disorders in the rectal area. This is due to the stagnation that is so frequent in the lower bowel, to the settling of the infection here through the

blood stream, and to the fact that in pulmonary tuberculosis, where one is constantly coughing and raising large quantities of poisonous germs, it is impossible to avoid swallowing some of them. Those swallowed are not destroyed in the digestive process, but continue through.

The make-up of the rectum or lower end of the colon lends itself well to the gathering in, and holding, of such stray germs, as the mucous membrane lies in folds and seams for the last couple of inches. The germs find ready lodgment in these folds, and soon begin to multiply and start trouble.

As the region containing the rectum and sex organs is one exceptionally well supplied with nerves and blood vessels, it is a bad place to have anything wrong.

Rectal ulcers take two rather general forms, the large and deep-seated ones called fistulæ, and the shallower surface ones fissures. The former are serious abscesses which may form either inside, with the opening either inside or outside, or form just outside of the rectum. The latter usually form just inside. Both cause more or

less discharge of pus and are often tubercular.

The most successful method of treating them is to cut them open and then cauterize them thoroughly. The work must be carefully and thoroughly done and all infected parts cauterized, or the operation is useless, as any infection that is left will simply spread and reinfect the other portions.

Where skillfully done, most of such operations are successful, but warning should again be given that rectal operations are delicate, and only surgeons of skill and experience are competent to undertake them.

Their danger lies in the serious results that may occur through improper or poor surgery more than from any other cause.

Cases are on record in which the sphincter muscle, the muscle governing the closing of the bowel, has been completely severed, leaving one without this control for the rest of his life. In other cases the mucous membrane and tissues have been so badly burned away as to leave nerves exposed, causing severe suffering.

Rectal operations are usually performed with a partial anesthetic; that is, an anesthetic is injected into the base of the spine, paralyzing the lower part of the body and legs. When there is trouble in the lungs, either this form or the purely local form of anesthetic is preferable, as will be more fully explained later.

An unusual case of trouble arising from a rectal operation came to light not long ago. A man who had had an ulcer within the rectum cauterized and healed, suddenly became partially blind. For a long time it seemed impossible to locate the trouble. It was finally found that before the ulcer was cauterized it had eaten entirely through the wall of the colon and some germs had escaped and set up an infection outside. In this case it was necessary to open the abdomen and clean up the infected area, after which the eye disorder disappeared.

General

There is a very grave danger in connection with all surgery on the tuberculous patient, but more especially from bone operations. The

infection may not be entirely removed, and may flare up again, or else may enter the blood stream and be carried to other parts of the body where it frequently lodges and sets up new areas of trouble.

When surgery is started it sometimes becomes an almost endless series of operations. However, in some cases, no other method is known of checking the trouble, and it is the only thing that can be done.

One should leave nothing undone to effect a cure, but let me caution here again that much harm is constantly being done by indiscriminate and ill-advised surgery, or surgery that is undertaken too soon. There is a time to operate and a time not to operate, and it requires experience with the disease to make the proper decision. When an operation is necessary for a tubercular infection, one should be sure he is in the right hands.

Plaster Casts

In cases of tuberculosis of the spinal column and joints, it is customary to use a plaster cast

with the idea of preventing the use of the diseased member. This method, while uncomfortable, is very effective, and as a rule excellent results are obtained from it.

CHAPTER VII

LIGHT THERAPY

THE theory is almost universal among laymen that when one becomes tubercular the first thing to do is to begin taking sun baths. Many new cases with mild infections do take them and get well, and those interested then lay the cure to the sun treatment and preach it on any and all occasions thereafter.

While sunlight is a valuable germicide, it can do inestimable harm when injudiciously used in cases of serious infections, especially pulmonary infections.

If people with tubercular infections could open their chests or other tuberculous infected spots and let the sun shine in directly upon them it would make short work of the infection, as the direct sunlight would quickly kill off the destructive germs. This cannot, of course, be done, and the nearest the direct sunlight can be

gotten to the spots where it is really needed is on the outside surfaces of the body.

Either real sunlight or the artificial light from the mercury vapor or carbon lamps is a very powerful stimulant as well as a most effective germicide, and in cases of severe infections may have just the opposite of the desired effect. When improperly used, and when used to excess it is likely to overstimulate, cause a rise in temperature, and in many cases a further spread of the infection. In cases of pulmonary tuberculosis, when the tendency to hemorrhage is strong, it may also induce further bleeding. Hemorrhage cases should never take light treatments and especially never expose the chest except upon the advice and under the direction of a competent physician.

As a matter of fact, and in spite of the general and widely held belief to the contrary, sunlight, either real or artificial, should never be used by any tuberculars except upon the advice and under the supervision of either physicians or technicians who are thoroughly familiar with its actions and dangerous reactions.

Savage peoples who go practically naked are used to the powerful effects of sunlight, as their skins are strongly pigmented and furnish a protection against it. White people, however, have long worn a cover of clothing, consequently their thin white skins do not furnish the same protection that thicker and darker skins do. For this reason, when overexposed the effects are so powerful that more harm than good may be done, especially when a person is suffering from tuberculosis.

Many otherwise mild infections have flared up and been fanned into serious form through over-exposure to sunlight.

In cases of pulmonary tuberculosis, when the trouble is at all extensive and active, the chest should never be exposed to the direct sunlight, either real or artificial.

In cases of infections of other portions of the body, light treatments are often beneficial when properly taken.

In taking such treatments there is always the tendency to overexpose and overdo, hurry the thing along too fast and cause sunburn and even

blisters. The lamps used to furnish artificial sunlight will burn and blister just as surely and even more quickly than the sun, and the effects of sunburn or blister from this source may be serious. Great care should always be used to avoid sunburn. A serious sunburn is just as dangerous as a bad fire burn.

The proper method of taking light treatments is as follows:

First day: Start with the feet to the ankles and expose them three minutes, then turn over and expose three minutes on the other side.

Second day: Expose halfway to the knees for three minutes front and three minutes back.

Third day: Expose to the knees three minutes front and three minutes back.

Fourth day: Expose halfway to hips three minutes front and three minutes back.

Fifth day: Expose to hips three minutes front and three minutes back.

Sixth day: Expose to chest three minutes front and three minutes back.

Seventh day: If proper to expose the chest, expose balance of body three minutes front and

three minutes back. When exposing the head keep upper portion of head or brain case covered and use colored glasses.

After exposing the body as far as the chest, or entirely as the case may be, for three minutes front and back daily, increase the exposure two minutes daily, one minute front and one minute back, until the maximum exposure desired, whatever it may be, has been reached.

In using the alpine lamp (mercury vapor) or artificial sunlight, the procedure is to be slightly modified to this extent: When the treatment is first started, and until the entire body has been covered the light should be kept at the maximum distance, then lowered one inch daily until the minimum distance desired is reached. The closer the lamp to the skin, the stronger the effect and the more likely to burn and to damage.

If there are no unfavorable reactions such as a rise in temperature, hemorrhage, or undue tiredness, the light treatments may be extended to one or several hours, depending on how one stands it.

If, however, there should be a rise in tempera-

ture, hemorrhage, or if one becomes unduly tired after the treatments, they should be either modified or discontinued entirely.

As previously stated, sunlight, either the real or artificial, is a powerful stimulant. It increases the rate of heart beat and causes chemical changes in the blood.

If there is much tubercular activity present, a great deal of poison is being thrown off in the process and this is being absorbed by the blood in an effort to get rid of it. When the heart and circulation are as greatly stimulated as they are during light treatments, this poison is whirled to every part of the body, setting up unfavorable reactions which manifest themselves usually in increased temperature and sometimes with hemorrhage. When this occurs, or when one feels dragged out or excessively tired after the treatments, it is an indication that he is not yet in condition to take them and they should be discontinued.

It may seem strange that sunlight, the great germicide and healer, should present such a menace, but it is a fact that it does, and many

people have done themselves irreparable harm, and have either greatly prolonged the time of healing or entirely forfeited their chances of recovery by injudicious and ignorant exposure to it. Even sitting in the direct sunlight when fully clothed may be harmful if there is too much activity.

The best time to take sun treatments is when one is well and before he is suffering from some serious ailment. If one does this, and lives properly, he will ward off colds and many other infections that attack human beings when their vitality is not up to par.

If, however, one has been unfortunate enough to contract tuberculosis, such treatments will be of great benefit providing they are taken judiciously, and one waits until the trouble is sufficiently healed to make it safe.

In the case of skin tuberculosis, the alpine lamp treatment is the only treatment so far known that is effective.

This lamp is a tube made of fused quartz with a quantity of mercury or quicksilver inside. At each end an electric connection is made. The

passing of an electric current through the tube vaporizes the mercury which glows and gives off a bright light very rich in ultraviolet rays. These are the rays that cause sunburn and tan and also act as a germicide and kill off infections that can be reached. If these rays could be gotten into the tissues where deep-seated infections lie they would soon clean them up so healing could take place, but unfortunately they do not penetrate like X-rays. In fact, they will only penetrate the flesh about one-tenth of an inch. However, they will kill any germs they can reach. They are invaluable in skin infections, and are a great help in throat and rectal disorders. It is necessary to have special lamps when using light treatment for the latter troubles. These lamps are also helpful in cases of tuberculosis in other parts of the body, but especially so in tuberculosis of the intestines.

There is as yet a vast diversity of opinion within the medical profession in regard to the good and bad effects of light treatments of all kinds, and many doctors have gone on record

as opposed to the use of light in any form in the treatment of tuberculosis.

Great good has been, and is being, constantly accomplished by the judicious use of both the natural and artificial light, and it is my opinion after a long observation and personal experience that nowhere near the benefits possible are at the present time being obtained, especially in cases of throat and rectal infections. The trouble seems to be that results are expected too quickly.

There are various other kinds of light treatments used for tuberculosis and other human ailments. One is the red-ray lamp which gives off very penetrative heat rays that are used in cases of rheumatism, swollen joints, and so on. It is not necessary to describe them all in detail here, however, as they are used only in special cases.

CHAPTER VIII

CLIMATE

As with so many other things in connection with tuberculosis, there has always been an erroneous opinion, very generally held up to within the last few years, in regard to the value of climate in its treatment.

Many years ago in this country, people with weak lungs who could afford the trip were sent to Florida. Later on it became the custom to send them to Colorado, Arizona, or New Mexico.

Of late years, however, it has become apparent that while climate is a factor, it has nowhere near the vital importance that it was formerly supposed to have.

Sanatoriums for the treatment of tuberculosis have sprung up all over the country, and one section is having much the same success as another.

There are some advantages and disadvantages in certain sections which may make one locality more or less desirable than another.

In cases with asthma, climate becomes a real factor and it is necessary to find a section of the country best suited to individual needs.

As a general proposition it can be stated that the best climate to seek when one becomes afflicted with tuberculosis is the one where he will be the happiest, best contented, and most comfortable.

It is, of course, out of the question to be entirely happy or contented anywhere when so afflicted, nevertheless one can attain a certain measure of these qualities so necessary in a successful fight against the disease.

Comfort is a matter, however, of surroundings and environment, and it does seem like rather useless hardship for one to worry along in a cold, damp, too hot, or otherwise disagreeable climate when there are so many places where it is agreeable and pleasant, always provided, of course, that one's circumstances and condition permit him to do the necessary travel-

ing and to support himself elsewhere than in his own home or wherever he may be located.

In order to help those who may wish to make a choice of location, an outline will be given of some of the principal localities in the United States in which considerable attention has been given to the handling of tubercular people.

It is not always possible to tell in advance what kind of a climate or which particular locality will be satisfactory. About the only thing to do is to chose a location, then try it.

One disadvantage of a location either in or close around some large cities is the fact that the air is usually more or less fouled by dust and smoke which shuts off a portion of the ultra-violet rays of the sun, the very rays that are most needed, while in higher, clearer altitudes, and especially where the climate is comparatively dry and there is less cloudiness, the sunlight is able to reach the earth without having these valuable rays filtered out.

Some authorities claim that the seashore is a favorable place for the ultra-violet rays, although it would seem that the great amount

of moisture always present in the air along the seashore would have a tendency to shut them off. I do know from personal experience, however, that sea air is very soothing and healing to many people with pulmonary tuberculosis.

The Adirondacks, New York

This locality will be named first, as it was here around Saranac Lake that the first effort at sanatorium treatment in the United States was made. One will find in this locality sanatorium facilities of various kinds to suit his needs. The summer climate is reasonably cool and agreeable. The winter climate is, of course, cold with plenty of snow, as one would expect in a mountainous country as far north as this. For people living in the northeastern section of the country it will be found to be a very satisfactory section for all-year treatment.

New England States

Many sections of the New England states, especially in the coast and mountain regions, present agreeably cool summer locations. The

winters, as one would naturally expect, are cold.

The Central Atlantic Region

This region along with portions of the coast and especially back farther in the mountainous country will be found to be a very satisfactory place for all-year treatment. The lower-lying interior portions are hot in the summer. The winters are mild.

Florida

Florida used to be the old standby for people with weak lungs until other sections of the country became better known and settled. As a winter location, it is hard to beat, and along the coast is fairly satisfactory as a summer location. The interior portions are too hot to be comfortable as a summer climate for sick people, especially for those with much fever. The humidity is high.

The Gulf Coast

The region immediately along the coast of the Gulf of Mexico is comfortable as an all-year cli-

mate with the exception of a couple of months in the summer when the breezes are from the land and it becomes unduly hot. The humidity is high.

El Paso, Texas

El Paso, with an elevation of about four thousand feet above sea level and situated in the southern Rockies, is a desirable all-year location. Here one finds a wide choice in sanatoriums and plenty of competent and experienced medical talent. The atmosphere is dry, the humidity low. The winters are mild and exhilarating. Summer days are hot, but the nights are cool and refreshing. An occasional dust storm is about the only drawback. In choosing the El Paso locality one has the advantage of being near a fine and progressive city with excellent transportation facilities.

Tucson, Arizona

Tucson, at an elevation of twenty-three hundred feet and on the main line of the Southern Pacific Railway, is located in a dry and arid portion of the state, but is a deservedly popular

place to "cure." Its dry and mild winters make it especially desirable at that season of the year. The summers are hot but dry and the nights cool. Many people find the hot, dry summers especially favorable for rapid improvement. Here one finds a wide choice in sanatoriums, homes, and various tent and cottage colonies, with competent and experienced medical attention.

This locality lends itself well to those desiring to live close to Nature.

Phoenix, Arizona

Phoenix in the Salt River Valley and at an elevation of eleven hundred feet provides an ideal winter combination of mild, dry climate where citrus fruits and figs are raised, a fine, progressive city with a variety of choice in accommodations, good transportation, and plenty of competent and experienced people to provide the necessary care.

Many find the summers rather hot for comfort, while others find the hot, dry summer air just what they need. For those who find them

uncomfortable the mountains with higher, cooler altitudes and a good variety of accommodations are close at hand.

Phoenix is deservedly popular among people who need tubercular treatment, and is also a popular winter resort for well people.

Albuquerque, New Mexico

Albuquerque with an altitude of five thousand feet gives one a fine combination of dry, mild, and sunny winters with warm, dry summers and cool summer nights. Here one can find a good choice of accommodations and competent supervision.

It makes a very desirable place to take the cure.

Colorado Springs, Colorado

Colorado Springs, at the foot of the Rockies with Pikes Peak in its back yard, an elevation of around six thousand feet, a fine, up-to-date city and with every kind and grade of accommodation that may be desired available, provides a fine all-year location in which to take

the cure. The winters are not too severe for comfort, while the summers are cool, sunny, and delightful. One sleeps under blankets throughout the summer.

Here the tuberculous patient will find an average low humidity, bracing air, and throughout the year a high percentage of sunshiny days.

As one becomes able to get about there are fine roads to travel and many interesting spots to visit. Tourists from all over make this a great summer mecca.

Denver, Colorado

The Denver district—that is, the city of Denver and the territory within a radius of twenty-five miles from it—contains the greatest aggregation of facilities for the care and handling of tubercular people that is to be found anywhere in the world. These facilities are of every type and price to suit the needs of all.

Numberless specialists in every branch of tubercular work are available both in private practice and in the hospitals and sanatoriums.

Eastern Colorado, or that portion of it lying

within about fifty miles immediately east of the main range of the Rockies, has long been recognized as about as near the ideal all-year climate for tubercular people as it is possible to find. This is due to its average altitude of several thousand feet above sea level, its proximity to the mountains, and its relatively southern position. The altitude of Denver is five thousand two hundred feet.

Of all this territory, Denver and vicinity is, of course, the most favored, not on account of climate, although this is the equal of, if not superior to, that of any other portion, but on account of Denver itself, a beautiful, modern, and cosmopolitan city of about three hundred thousand people and the facilities for handling tuberculars that have already been mentioned.

The winters at Denver are relatively mild with very little sub-zero, and in fact not much below freezing weather, and this mostly at night. The air is dry and invigorating and the proportion of sunshiny days is high. It is doubtful if so many fine, sunny, and ideal days can be

experienced anywhere else in the course of a year. The summer weather is rarely too hot for comfort. Even on warm days it is cool in the shade, the nights are cool, and one does not suffer and perspire as in lower altitudes, where the humidity is high.

Denver is also unique among large cities, because of its freedom from a pall of smoke and dirt. This is due to the fuel that is used—mostly lignite coal and natural gas. Both of these fuels are remarkably free from smoke and soot.

Southern California

In southern California one may find a variety of climate to suit every need, from the cool, moist climate of the Pacific Coast to the high, dry, cool climate of the mountains, and the hot, dry air of the desert, all within a comparatively small area. It is out of the question to describe in detail each locality, nor is it necessary to do so. A general outline will be given and later on information will be furnished as to how to secure further details.

Immediately along the Pacific Coast one gets

the moist coolness of the ocean, together with fog in the forenoon at certain times of the year, also considerable rain. Naturally the hours of sunshine are less here than elsewhere in this section.

In the immediate vicinity of Los Angeles one finds some fog and rain at certain seasons, but always a high average of sunshine throughout the year. The winters are mild and practically free of frost. Summer days are hot in the sun and cool in the shade. The nights are cool and refreshing.

At various points in the mountains, depending on the altitude, one may find almost any kind of climate he wishes. In the lower altitudes one will be above the fogs, and yet have the cool, dry air and the sunshine, while in the higher altitudes one may find gradations up to the summer snow belt.

In the desert regions will be found the mild, dry, sunny winters and the hot, dry summers.

All over the southern portion of the state in various places, but especially in the Los Angeles district, will be found ample facilities of every

type and price, together with trained and experienced personnel and specialists for the care and handling of tuberculosis.

Many localities are ideal for all-year treatment, while for those whose circumstances and condition permit, a short move will furnish a radical change if desired. All over this portion of the state the winters are extremely mild except in the high altitudes. Frost is rare and in some regions entirely absent. Outside of the coast region the air is dry. Nights are cool everywhere. The proportion of sunshine is high.

All in all this is a most desirable place to go if one has tuberculosis and is looking for an agreeable place in which to take the cure.

As one convalesces and becomes able to get about, there is besides Los Angeles a metropolis of over a million population, many other fine cities and towns as well as the ocean beach, the hundreds of miles of paved roads, and the mountains, and in addition one can go out in the yard and pick ripe oranges off the trees for breakfast.

Northern California

No particular effort has been made to exploit northern California as a health resort or even as an especially desirable place to live, and yet it possesses a fine all-the-year climate with a wide variety from the moist climate of the coast to the dry and cool air of the mountains. This section is lacking in facilities for the care of tuberculosis, but if one is looking for an ideal place to move and establish a home it can be found here.

This section will some day be more thickly settled and a vast population will find it one of the most agreeable places in the country in which to live. Its mild winters and agreeable summers are hard to equal.

The Pacific Northwest

People who have not visited this section ordinarily think of it as a sort of rainy, cloudy region, and are not aware that it is necessary for the farmers and truck gardeners to irrigate their crops, as the summer rainfall is not sufficient

and the sunshine is so strong as to make it necessary.

The climate of this section is so modified by the Japanese Current of the Pacific Ocean and by Puget Sound that some authorities have made the claim that it possesses the most invigorating climate to be found anywhere in the United States.

It has not been exploited as a climate for tuberculars, consequently facilities for their care are limited to the needs of the various localities. Nevertheless, it would be hard to find a more agreeable all-the-year place than the section west of the Cascade Mountains through Oregon and Washington. The winters are mild, rarely getting much colder than twenty-five above zero, and the summers are a rare combination of long, sunny days with cool nights. Immediately along the coast the fog and moisture make it less agreeable.

Regardless of what one may think or have heard to the contrary, the rainfall is not excessive, and most of it comes in the winter season.

Considerable snow falls, but even that is soft

and agreeable, not the harsh, hard snows of cold climates. It makes you long to be out of doors instead of seeking shelter.

Some tuberculars might not find this climate suitable, but this is true of every section, even those so strongly recommended; nevertheless it is a most agreeable all-the-year place in which to "cure," and one where the hardships from climate are for the most part absent.

CHAPTER IX

SANATORIUMS

FOR those who have had no previous experience with sanatoriums, the following brief information on rates, clothing, and equipment necessary, is given.

The rates in tubercular sanatoriums and boarding houses have a wide variance and range from eight to one hundred dollars per week, depending upon the class of service furnished and the condition of the patient.

In boarding houses, as a general rule, the rate covers board and room only, as such places are not usually equipped to do much nursing. Except in special cases these places do not cater to really sick people (bed patients), but are more suitable for ambulant patients, or those able to be up and about, and to go to meals, take their own baths, etc. Some of them, however, are run by nurses or cured tuberculars, and so

are able to do a limited amount of light nursing. In practically all of these places it is necessary for patients to make their own arrangements for such medical attention as they may require.

In small private sanatoriums some nursing is usually done, and some of them have arrangements for furnishing medical attendance. They do not, as a general rule, cater to really sick people, but are better able to handle incipient and light cases.

In the larger sanatoriums it is the almost universal rule to have doctors in attendance. Practically all such places have a doctor as superintendent, and when there are sufficient patients there are often several on the staff in regular attendance.

In places with a medical staff in attendance the rates should include rooms, meals, nursing, and a doctor's care. Medicine, surgery, X-ray, and special treatments are sometimes extra and sometimes included on the rate. The practice is not at all uniform.

Rates for boarding houses should run from eight to thirty dollars per week. For small

private sanatoriums, from ten to thirty or thirty-five dollars per week.

In the large places they run from ten dollars per week up to a hundred, depending upon many different factors.

Many places have a sliding scale or differential rate for bed and ambulant patients, while others make a charge for meal-tray service.

About the only way to get to the bottom of the price problem is to select those that seem desirable as to location and other qualifications; then, by getting in touch with them, learn the details of prices, services, etc., and find out just what is included.

The best way to get a good line on what locality and sanatorium to choose is to either subscribe for, or secure, a copy of the *Journal of Outdoor Life,* a monthly magazine published by the "National Tuberculosis Association," 370 Seventh Avenue, New York. In a late issue there appeared advertisements from seventy sanatoriums of every kind and description in every section. Out of such a list one should be able to make a satisfactory choice. Many of the advertisements carried pictures of the places.

For twenty-five to thirty-five dollars per week one should be able to get satisfactory service in high-class places.

As so many people are puzzled as to what to take to a sanatorium in the way of clothing and equipment, a general outline will be given.

Take a trunk with your ordinary clothes. If you are well enough to be up and around you will want them, and in any event, even if confined to bed when first you enter the place, you will need your clothing when you begin to convalesce and get around again.

A heavy and a light-weight bath robe for winter and summer wear will be needed, or better yet, two of each of the washable kind, so they may be laundered when needed. They receive so much wear that they get soiled.

Take a plentiful supply of both winter and summer pajamas. Night dresses or night shirts are not suitable for sanatorium use. Patients spend much time in bath robe and pajamas.

Slippers and a good supply of stockings are also necessary.

Towels are invariably furnished, but not wash rags. Take a supply of them along.

Practically every place is supplied with hot-water bottles, fountain syringes, and such equipment, nevertheless you will find it more convenient, and to your advantage, to supply yourself with a fountain syringe, at least one hot-water bottle, and if you are going to a place where it is at all cold, an electric heating pad will be found to be a great comfort, and in many cases, especially when troubled with cold feet, an absolute necessity.

Most places have arrangements so patients may buy the small necessities as they go along, and in the larger places there is usually a "storekeeper" who looks after the small needs of patients.

Some places require that patients furnish a heavy blanket to wrap up in when sitting or reclining out of doors, so it is well to take one along. It will be found to be a handy thing to have.

There are a few free sanatoriums in the country kept up by various organizations where their own people are taken care of, and a few free places outside of county, state, and city institu-

tions that are open to any one. Unfortunately there are not enough of the latter, and their capacity is so limited, in comparison to the number who need free treatment, that it is a rather hard matter to get into one of them.

The one great drawback to most of the free places kept up by organizations is that they often arbitrarily limit a patient's stay, regardless of his condition, and it often happens that the time is too short to effect a cure, and it becomes necessary for the sick one to move before he is in condition to do so. The worry over this matter, and the actual moving only too often cause a reaction that is decidedly detrimental. It is hard to understand why such a short-sighted and foolish policy is followed. The plea that it is done to distribute the benefits to the greatest number of beneficiaries does not seem to be a good one, as it too frequently happens that the patient would have been better off without the free treatment.

Some of the best conducted free institutions have removed the time restrictions entirely, and their rule now is to keep the sick one as long

as he can be benefited. This is a wise and far-sighted policy, and results in relieving the sufferer from worry so that all his energies are devoted to the healing. A worried patient will not make progress.

Strange as it may seem, it was the policy up to a comparatively recent time for some of the largest of the pay institutions to also set an arbitrary time limit. It is to the everlasting discredit of the people responsible for the management of these places that the only reason they discontinued the practice was that sanatoriums began to spring up and competition forced them to change. One can in a measure forgive a free institution for such a practice, but assuredly no excuse can be offered for one that charges full rates for its service.

There is one great drawback to all hospital and sanatorium treatment and that is the monotony and lack of seasoning of the diet, and in many cases the careless manner of its preparation. People who have the handling of the food and diet must be people lacking in imagination and thinking power, as in nearly all cases they

seem incapable of figuring out menu changes that would break the monotony. In some places where the prices and the general service are on a plane sufficiently high for one to be justified in expecting better things, you know a month in advance exactly what you will have for breakfast, dinner, and supper on Monday, Tuesday, Wednesday, or any other day the coming week. Not enough attention is given to the diet of the individual.

One sometimes wonders where the cooks in these places learned so many different ways of spoiling good food.

Food is one of the most important items in the care and treatment of tuberculosis, but unfortunately it seems to receive the least attention, and consequently causes more friction and dissatisfaction than all the rest of hospital and sanatorium practice combined.

For the reasons just set forth, home treatment is preferable where the necessary care and attention can be given, and where the surroundings are reasonably satisfactory.

CHAPTER X

PREVENTION

THE best time to start prevention is before the potential patient is born. It doesn't do much good to lock the stable after the horse is stolen.

It is too much to hope that tuberculosis will be entirely eradicated by preventative measures, as many people now seem to think it will. Humanity simply isn't "built" that way. The average run of people simply will not buy a lock until the horse is gone. Nevertheless, knowing this human failing so thoroughly, the way of prevention will be pointed out and emphasized in the hope, not that all will note and be profited thereby, but that perhaps some may be induced to buy a lock in time.

There is an old saying that children have a right to be well born. This does not necessarily mean they have a right to be born to a heritage of wealth or culture, but it should mean a right

to be born to a heritage of good health. Children born of sickly or weakened parents are apt to be puny and weak, whereas children born of strong and vigorous parents are likely to be strong and healthy. A strong and healthy child is the best insurance against tuberculosis. It is reasonable, then, that the proper start for healthy children should be with the parents.

As previously pointed out, calcium is chiefly responsible for the formation of bone, muscle, and teeth, and a lack of calcium results in rickets in children. As this same lack of lime is one of the chief contributing causes of tuberculosis, the question naturally arises as to how to secure proper nutrition in childhood.

Various methods of securing additional calcination in grown people afflicted with tuberculosis are resorted to with, for the most part, very indifferent success. So far it seems hard to get a form of calcium that will be absorbed and utilized in sufficient quantities to be of any particular benefit. Attempts are made to get it into the make-up of the body through the medium of lime water, by taking it dry into the stomach,

and by injecting a solution of it into the veins. Probably some benefit is obtained in this way, but not as much as could be desired.

The easiest time to get a good calcium assimilation seems to be in early childhood, when the new bones and tissues are being formed. The earlier in childhood this start is made the better, so then let the parents prepare themselves for parenthood before conception takes place, by getting themselves in good physical condition, and by practicing continence at least a month before conception, rather than trusting to the haphazard methods usually followed.

The best way to get themselves in good physical condition is by proper living conditions, and by taking a sun bath daily as already outlined. In case it is not practical to take the sun, artificial sunlight from the mercury vapor or carbon arc lamps will do very well. Almost every one, however, even dwellers in city apartments, can find some unexposed place where they may take a sun bath for a short time each day. For people who live in their own homes or on farms the problem is simplified. It is not

necessary for farm men or any men who work out of doors in the sun to resort to sun baths either real or artificial, but it is essential that the wives of such men do so unless they also spend a considerable part of their time out of doors.

Nature intended us to be creatures of the sunshine and open air, but by the changes which have come about in our lives and living conditions, we have gotten away from this ideal, although our need of it is just as urgent as ever.

The prospective mother should follow up the sun baths throughout the period of pregnancy, and in addition feed herself on good substantial bone and muscle-building foods such as lean meats and an abundance of fruit and vegetables of all kinds, both cooked and raw. The sun baths (either real or artificial) will stimulate the body and blood stream and cause a better assimilation of the normal salts and chemical elements so necessary in the formation and growth of an unborn child. If in addition the prospective mother will, when needed, feed herself during this period with some plain, old-fash-

ioned cod liver oil she will do both herself and the coming child a great favor.

Although a child may be born strong and vigorous, it does not take long to start it on the wrong road if it isn't well nourished after birth. If the child is to be breast fed it is well to have the mother's milk examined immediately to see whether it is adequate for proper nourishment. If not, arrangements should be made either to supplement it or provide a complete substitute.

When both the mother and child are healthy and strong, and the mother's milk adequate, there is practically no danger of undernourishment and rickets, provided other conditions are kept satisfactory.

Anyone with experience in raising house plants will know that it cannot be done successfully unless they are given a good measure of sunshine. If kept back in dark and obscure portions of the house, they will soon cease to grow, and the leaves will turn pale and sickly, and many of them will fall off. Kept away from the light long enough, they will eventually die. If then a plant that has been robbed of the sunlight

is moved over to an east, south, or west window, where it can get the sun for even a short time each day, it will quickly brighten up and start to grow. Babies are like flowers and need sunlight just as much as they do, and if it is denied them much the same results will follow.

The young child, then, should be given daily doses of sunshine when it is at all possible and available, the real sunshine in preference but the artificial if the real is impractical. Extreme care should be taken to see that either is given in sufficiently light doses so as not to burn the tender skin. Extreme care should also be taken, when using the artificial light, to protect the baby's eyes with dark-colored goggles, as it will burn the eyes as quickly as any other part. Regardless of the general belief to the contrary, it is doubtful if the real sunlight can hurt a baby's eyes, unless, of course, it is allowed to shine directly into them for a considerable time.

If the mother of the newly born child is not strong and vigorous, whether it is to be breast fed or not, no time should be lost in adding pure cod liver oil to its daily diet.

When possible to do so it is best to have the advice of a physician who thoroughly understands baby feeding. A baby specialist is best. Many people, however, cannot afford to have a doctor, to say nothing of a specialist, unless absolutely needed, but almost every one can afford to buy a bottle of good cod liver oil.

Cod liver oil is bottled sunshine. It is the greatest and quickest corrective of rickets known. If your baby should show signs of rickets, it is miraculous what a course of it will do in a short time to correct the trouble and start the youngster on its proper way again. It should not be allowed to go too far, however, as even this agent, wonderful as it is, cannot do the impossible.

If in addition to properly nourishing food and the cod liver oil, the baby is given daily doses of sun and outdoor air, the chances are good that it will develop well, and avoid many ills that poorly nourished and weakened babies acquire, and in this manner the very best foundation for the prevention of tuberculosis will be laid. The first two or three years of a child's life are the

most vital in the manner of laying a proper health foundation. It is quite generally agreed that it is during this period that the foundation weakness is usually laid which later in life may result in tuberculosis.

Especial care should be taken of fall and winter babies to see that they get plenty of sun and fresh air. On account of the cold and inclement weather there is a tendency to keep them too much indoors. Spring and summer babies usually have a better chance, as the weather is better, and the natural tendency for mothers and nurses is to get out of doors more. Then, too, in the wintertime there is more cloudiness, consequently less of the ultra-violet rays come through.

The objection may be raised that the outline just given for prevention in babies is not practical for many people, as they will not read, nor would they profit by the information if they did read. This is true. There is a portion of the population that is so well satisfied with its present state of ignorance, that the only way to get new information to them is by word of mouth,

and even then many of them will pay no attention to it. However this may be, there is a large and growing host of people who do read, and who are glad to receive and profit by new information. It is this class that it is hoped to reach. It would be an idle wish to hope to reach all.

In growing children, after the baby age, the best method of prevention is plenty of good, wholesome food, ample rest, as much sunshine as possible daily, and freedom, as far as possible, from all sorts of ailments, and especially of colds. Children are bound to have more or less sickness, and by the nature of their play and their careless habits acquire colds. If good care is given them during these child sicknesses, and no weaknesses are allowed to develop, and if colds are taken in hand and checked as quickly as possible, much will have been done to enable them to build strong bodies with good resistance to the germs of the "White Plague"—tuberculosis.

There is a tendency on the part of many people to figure that children are bound to have

colds a good share of the time, especially in cold weather, and to let them go about with running noses and other signs of sickness without doing anything about it. When they do this they are simply laying the foundation for later trouble. By permitting nose and throat colds to continue, the mucous membrane of these parts becomes chronically inflamed, and disease germs of various kinds find there a fertile field to lodge and grow. This is the way the seeds of many dangerous diseases, but especially of tuberculosis, gain a foothold. As has been previously explained, the germs of tuberculosis are hard to kill. When they find their way to the chronically inflamed and weakened membranes of the nose and throat, they embed themselves, and so have found a permanent home, and are ready at any and all times thereafter to break loose and set up new infections.

It is these germs permanently embedded in the linings of nose and throat, and the consequent chronic inflammation that produce catarrhal conditions. From here they work their way into the lungs or other portions of the body, and

then a full-fledged case of tuberculosis is contracted.

From this it can be seen how dangerous and how detrimental to the future health of the individual it is to neglect these conditions in childhood.

After the childhood period, and throughout the danger period, up to about twenty-five, the best preventative measures are common-sense ones. Plenty of good, nourishing food, and rest, adequate clothing, well-ventilated sleeping rooms, sunshine, fresh air, and reasonably regular hours. Freedom from over-work, over-study, and over-play are essential.

If the age of twenty-five is passed with the body in a good, healthy state, there is not much danger of contracting a new tubercular infection. However, it is best for people beyond this age to use the common-sense preventatives just enumerated, and never permit their vitality to get low. A case of tuberculosis may be developed after this age, as has been previously explained, through lowered vitality caused by sickness, especially pneumonia or influenza, fre-

quent childbirth, a general anesthetic (ether), overwork, shock, exposure, overplay, sexual or other excesses, or by infections from diseased teeth or tonsils. It will be recalled that the difference between "contracting" and "developing" tuberculosis was explained in this way; that in "contracting" it a new infection is started, whereas in "developing" a case it is the activation of an old, dormant lesion that had been healed perhaps for years. Many times the presence of such a lesion is unknown. The protective walls around it break down when resistance is lowered through some of the causes just enumerated.

Bad teeth or tonsils should not be neglected. They are a very grave danger.

If one is unfortunate enough to lower his vitality and resisting powers to the danger point, and sees any of the symptoms of tuberculosis previously pointed out here he can often throw them off by a good rest in time. The rest cure is the best medicine for many kinds of ailments, but it is the *only* medicine known for tuberculosis, and if it were used more often in liberal

doses when the symptoms first appear there would not be so much tuberculosis.

Much has been and is being said constantly about exercise, but very little has been said about rest.

If people would take daily sun baths, and not wait until they are sick, they would avoid most of their colds and other sicknesses, and keep up their vitality. This, of course, does not refer to people who work in the sun, as they get enough and are usually healthy, but it does refer to all kinds and classes of people who are not exposed in any way to sunshine.

The general impression prevails that any milk that comes from farm cows is good and therefore safe and proper baby and child food. This is not true, as has been demonstrated so often when tests for tuberculosis are made upon dairy herds. Usually some will be found to be "reactors" or to have the disease in some form, either incipient or advanced. No milk is safe unless it either comes from tested and tubercular-free cows, or else is pasteurized. Pasteurization of milk is accomplished by heating it to 142-145° F. for

thirty minutes so as to destroy any dangerous germs that it may contain. Pasteurized milk, while good and wholesome, is possibly not quite so good as raw milk from tested and tuberculosis-free cows.

In practically all cities of any size it is now the custom rigidly to supervise the milk supply, and insist that all milk be either pasteurized or be from tested cattle. Certified milk can usually be had at a slight increase in price over pasteurized.

Such safeguards are not usually available to people living in the smaller towns or to many people on the farm unless testing is the rule in that locality. While it is true that the testing of milk cattle is becoming quite general, there are nevertheless sections where this is not done.

People should always know whether their milk supply is safe or not, and in case pasteurized or certified milk is not available, it should be pasteurized at home. Milk that has not been so safeguarded is unfit for babies and growing children.

If people could visit the hospitals and see

some of the pitiful cases of tuberculosis other than pulmonary, they would never use unsafe milk again.

Summary of Prevention

Parents should prepare themselves physically for parenthood.

The prospective mother should eat good bone and muscle-building food and take sun baths and cod liver oil when needed during pregnancy.

The baby should have good food, daily sunshine and fresh air, and where needed, cod liver oil. It should be kept away from persons with colds and other sickness.

Growing children should have plenty of wholesome food, rest, fresh air and sunshine, and kept as free as possible of sickness.

Up to the age of twenty-five contacts with people with active tuberculosis should be avoided. Such people should not live in the home with young folks under twenty-five except under the most rigid care to avoid infection.

All excesses in work, play, or otherwise, and

also exposure, or in fact anything that will lower the vitality and resisting power, should be carefully avoided. Colds should receive immediate attention.

Only pasteurized or certified milk should be used.

And last, but most important of all, one must not neglect the symptoms of tuberculosis already pointed out, or let them go thinking they will get better. The chances are that they will not. Rest in bed will usually check it before it gets a start. The rest cure is not only the best known cure, but it is also the greatest preventative known when used at the right time.

CHAPTER XI

MISCELLANEOUS

ALTHOUGH some reference has already been made to the procedure, I believe it well to give an outline of the methods used by experienced physicians in diagnosing tuberculosis.

The X-ray is used as an aid in all forms. In pulmonary cases the stethoscope, an instrument for listening to body sounds, and the fluoroscope, a sensitive screen that utilizes X-rays and enables an operator virtually to look through the body, are both used. It requires experience successfully to use any of the three. In addition, physicians tap the chest, and are guided by the resonance or lack of it.

There are also various blood tests which are technical and not to be described in a work of this sort.

Pulmonary tuberculosis is the hardest to detect, as a rule. Other forms manifest them-

selves by surface indications that can hardly be mistaken.

Cases of pulmonary tuberculosis may or may not have fever, or show hemorrhage. In fever cases it is the usual but not invariable rule for the fever to come in the afternoon. Sometimes, however, it comes in the morning, sometimes in the middle of the day, and sometimes in the evening. It even occasionally runs through the night, but not often. The usual time for the high-fever point is in the afternoon or evening.

While too much fever, like too much of many other things, is not good, and burns one up too fast, it is nevertheless a more or less favorable sign and indicates that the body is putting up a good fight. The fever may be considered as the friction generated by the heat of battle.

It is well to drink plenty of water at all times even when one is in health, but it is even more necessary when one has tuberculosis, and especially so when running fever, providing the kidneys are normal and will stand it.

Fever drags on the appetite and causes food to

become more or less repellent rather than welcome. At this time as much food as possible should be taken, always keeping in mind the fact that food is ammunition and without it one cannot maintain his strength and successfully fight the "battle of the germs." If sufficient solid food cannot be taken, milk should be used. It is the greatest body builder.

Chills very frequently go along with fever, especially in cases of mixed infections. These are usually accompanied also by sweat. The chill is an indication of an excess load of poison which has not been eliminated.

If the sweat follows the chill it acts as a safety valve and helps to throw off the excess poison. When the sweat does not follow naturally, it should be induced by the old-fashioned method of hot drinks, hot-water bottles, and plenty of blankets. If a sweat does not come either naturally or through inducement, the patient is likely to suffer very bad results.

It not infrequently happens that a bad skin rash, usually on the face and neck, occurs in tuberculosis. This is simply another of Nature's

methods of ridding the system of poison, by forcing it out through the skin.

Many other complications come with the disease, such as trouble with the heart, kidneys, liver, or other organs. In the majority of cases it is probable that the trouble is traceable to the disease itself, in others there were probably weaknesses and the disease attacked the weak spots. In any event, these complications are often a serious handicap in the fight against the disease, and are only too frequently the deciding factor as to whether the fight is won or lost.

Bad teeth may be a factor in the acquirement of the disease, just as any diseased part is a handicap. However they probably are not any more of a factor in this than in many other infections. The percentage of bad teeth among tuberculars is probably no higher than among well people, and it is no uncommon thing to see tuberculars with perfect teeth.

There is a complication or rather a condition often mistaken for tuberculosis and in many cases it does lead to it. This is the condition known as miner's and stone cutter's lungs. It is

due to a gathering of dust in the lungs and is apt to be contracted by anyone who works under conditions where he constantly inhales large quantities of insoluble dust.

Some Things to Avoid

Too hot baths are not good for well people as a rule, but for people with active, latent, or healed tuberculosis, really hot baths, Turkish baths, steam baths, and the like are absolutely to be avoided. The excessive heat seems to activate the germs by depressing the vitality of the body. For the person who has had a light case and has it healed, probably little or no harm will be done, but for those who have had considerable involvement, the danger is great and will remain so throughout their lifetime. Such baths are especially dangerous for hemorrhage cases, whether active or healed, and are apt to bring on other hemorrhages. Any heat, such as comes from a hot-water bottle, is bad when applied to the chest of such people.

It is well to remember, when one is fighting the disease and has it in an active form and also

after it becomes quiescent, that in gauging its progress in some forms other than pulmonary it is possible to see the exact status of the healing, but in pulmonary tuberculosis it is impossible to see inside of the chest, so that neither the status of the disease nor the progress made in healing can be seen, but must be judged from external indications such as the general condition, fever, appetite, X-ray, fluoroscope, stethoscope, sputum tests, and so on. Neither is it possible for doctors and others in charge always correctly to gauge either one's resistance to the disease or his recuperative powers; consequently a time may come when one has been taking the rest cure for a long time that sufficient healing has been done and the infected areas are well enough walled in so that one will make better progress to begin to exercise gradually. This may sometimes be true, even when all bad symptoms, such as fever, etc., have not entirely disappeared. The time may even come when one may do better by going to work than to continue the "cure." There is apparently a peak point after which activity and exercise stimulate and spur on the healing proc-

esses. When the time seems to have come for exercise and change, one's doctor should be consulted and his advice given due weight and consideration. The fact should not be lost sight of, however, that he is dealing with someone else's life and body and that his tendency should be toward conservatism; that is, to take the safe course. Sometimes it is best to take matters in one's own hands, for each one to assume his own responsibility, and start to exercise or work as the case may be. Handling tuberculosis is very largely a matter of cutting and trying, anyway. About the only way one can tell is to try, and see what the results may be. Many have gone contrary to well-meant advice in the matter of when to start exercise and when to go to work and have won out by it. Many more have failed, but if they are careful and do not go too far, not much harm as a general rule need result from trying. It is not well to disregard the instructions of your doctor. The fact is simply pointed out that many do so successfully. Timid people who are afraid of their own shadows and do not like to make their own decisions, do not do as well in fighting

the disease as bolder and more courageous ones. One should not get scared. The bold and fearless front is best and is a great asset to a tubercular. "Try it and see" is, many times, the best motto to follow. However one must not lose sight of the fact that it is best to be careful when the time comes to get up and not rush out and destroy all the benefit gained by a long siege of "curing."

When the patient does get up and about, he must avoid violent exercise or work, especially if he has had considerable trouble. He will have more or less newly formed scar tissue and this is soft and easily ruptured. It takes some time for it to toughen so it can stand hard usage. When the lung is full of soft scar tissue there is grave danger if the exercise or work is too violent that the lung may collapse entirely. If this occurs it is very apt to cause death. I will cite a case to show what may occur. A man in a sanatorium in Wisconsin had put in several years in "curing" and had gotten along well. His trouble was healed and he looked and felt so well that he decided to go to work. He started out on the road as a salesman, traveling by automobile in the

wintertime when the ground was frozen and the roads rough. After a few days he had a complete lung collapse and died in a short time. He had started in too strenuously, and the jolting of the car on the rough road, together with the work of driving and his other activities, had been too much for the soft, mushy tissues with which his lung was filled, and it simply collapsed. This man had made a good "cure" and had he taken proper care of himself when he went out and secured some light occupation for a couple of years while his lungs were getting toughened, he would probably have finished out his life and died of old age. This case is typical of many and serves to illustrate the need of caution when first getting around. One should take into consideration the amount of involvement in gauging his actions. Where there has been only a small area involved there is no danger of collapse, but where the area built up with scar tissue is considerable, the danger is there. The greater the involvement the greater the danger. Your doctor can tell you the amount of involvement you have and where it is.

There is another form of lung collapse that sometimes comes while the disease is active and is known as a "spontaneous collapse." The disease may extend to the outside of the lung and make an opening so air can get between the lung and the chest wall. When this occurs the lung collapses. Cases are known where the spontaneous collapse of a lung caused it to heal, and so proved beneficial. In some cases the shock of the collapse is fatal. Where both lungs collapse at once the result is, of course, immediately fatal.

Dancing, excessive drinking, and irregular hours are bad not only immediately after "curing" but always thereafter. When one has been thoroughly "cured," and after a reasonable time has elapsed, a limited amount of dancing will do no harm, providing one does not get overheated. Any exertion that causes sweating and overheating is to be avoided. It simply incubates dormant germs and may cause a relapse. One cannot afford to take the chance. A regular schedule of working and resting rigidly adhered to is essential to success.

Drugs must be avoided as much as possible,

both during treatment and ever after. There is always the temptation, when one is sick, miserable and cannot sleep, to resort to narcotics. This must be overcome unless, of course, in some real serious crises it becomes imperative. By resorting to drugs and narcotics on every pretext one is simply lessening his chances that much.

When possible it is well to avoid general anesthetics; that is, ether, gas, or chloroform taken into the lungs to produce artificial sleep. Such anesthetics set up a violent reaction. The lungs fight against it and an intense irritation and inflammation is set up which will sometimes break down the protective walls that have been built up around the lesions, and arouse dormant germs to action, and will also provide a fertile field for new infections. Such anesthetics have been the cause of many flare-ups of well-healed cases. The facts are well known to all doctors with experience in tuberculosis. There are times, of course, when it is impossible to avoid a general anesthetic, but it should be shunned by all means when a partial or a local anesthetic will answer. If it becomes imperative to take a gen-

eral anesthetic a long period of rest should be taken immediately after, to permit the damage to be repaired. I believe the general anesthetic to be the gravest and most subtle menace the cured tubercular has to face—subtle because its damaging results will probably not show up for some time.

Worry must be avoided as much as possible. It is, of course, out of the question to avoid it entirely at any time but especially is it bad after the first breakdown. However one can school himself in this as in other things, and it is really surprising what can be done toward eliminating it entirely. Probably every one has heard that worry does no good, and that one can get along without it, but he no doubt puts it down to the usual "old saying" that doesn't mean anything. It is a fact that one finally reaches the point where worry ceases, and he can laugh at almost anything. In fact the time often comes when that is the only thing left to do.

There is one outstanding danger to young people after a first breakdown, and that comes from good fortune and not from bad. Pulmonary tu-

berculosis in its early or incipient stages almost always responds very quickly to proper treatment. Sometimes a few months suffice to restore the sick one to apparent good health again. I say apparent with a purpose, as that exactly fits the case. One gains back lost weight and color, stops coughing and feels fine. In fact feels so well after the prolonged rest that he finds it hard to keep from doing many things he should not do. This is where the danger comes in. The period of convalescence is the most dangerous time of all. It is easy then to undo all the good that has been done. I have just explained in another connection how the soft scar tissue is built up around the lesions or wounds in the lungs. If this is ruptured it is much harder to repair it again. Sometimes when the first healing comes too quickly it is a real detriment, and odd as it may seem to say it, one would have been better off had the cure been slower. The ease with which the "cure" comes gives a feeling of false security and carelessness is too apt to ensue. The conclusion is, "Oh, well, if I do break down again, I can soon heal it up the same as I did last time." It does

not come so easily the next time. It is slower and more stubborn, and every time it gets harder until a time will come when it is no longer possible to conquer it at all. It has then won the battle.

The Second Breakdown

It will be well here to point out a few symptoms of a second breakdown. They are likely to be somewhat different than those of the first, as conditions will have changed considerably. About the first sign is that the patient will begin to tire easily again and feel dragged out. He will be nervous and sleep poorly. If he has previously had any throat or rectal inflammation it will again flare up. The throat especially may become chronically inflamed with an inflammation that will not respond to sprays, cough drops, or lotions of any kind. If he now goes to incompetent doctors or specialists they will likely call it chronic laryngitis, or tonsilitis. Some will recommend the removal of tonsils. This is the time to get to an experienced tubercular man before going any further. He will pass on the matter

and decide on whether the tonsils should come out or not. The chances are that they should not. When these symptoms of a second break come, the best and safest course to pursue is to get to bed and rest as soon as possible. One will never go wrong on this. Old and experienced tuberculars learn to do this whenever they feel themselves slipping. With each succeeding breakdown the defenses grow a little weaker; the blood and tissues a little more tired. The body becomes like a nation at war; it grows weary of fighting and longs to lay down its arms. The best plan is to so live that a second or succeeding break will not come, but if it does come, there is only one thing to do, and that is to start the rest cure again as quickly as possible.

Relative to Leading a Normal Life

Tuberculars who have had a light case, caught it early, and made a good cure, should, by being careful, and, barring bad luck, be able to lead a normal life. This, however, is not true of people who have had a severe case, and the sooner that such realize that they are cripples the better

off they will be. They are cripples even more than if they had lost an arm or a leg, as people minus a limb may at least be strong and healthy. When one reënters the workaday world after a long siege, it is necessary to compete with well people if one is to hold his place in the sun, and the strain on limited strength and vitality may be too much. Under such circumstances it is best to try to get into something where one may rest when the need of it comes. It is not always possible to do this, but many times by exercising a little ingenuity one can make such a place for himself. Later I shall give a brief outline of some practical occupations for tuberculars. The need of regular hours and an opportunity to rest when necessary is imperative. Tuberculosis is a hard taskmaster, and one with which there is only one compromise, rest. If you feel yourself slipping, don't fool yourself into thinking you can put it off for a while. You may be able to do this as many times tuberculosis is slow in developing, but it is nevertheless sure, and the longer you put off resting the harder the task when you do get at it.

Marriage and Children

Definite advice against marriage is given to people who have had a serious breakdown. For those who have had a light case, and have made a good cure, there is not as much danger, but even they are taking a long chance. This advice is modified to the extent, that when they have money enough or an assured income sufficient to keep going in case of trouble, and tide over a several-year period of sickness with the possibility of total and permanent loss of health and earning power, there is perhaps a justification for it on the grounds of love and companionship only. But when money and income are lacking there is no justification whatever for tuberculars marrying. If it is the man who is the tubercular, and he breaks after the marriage, the earning power is gone, and the wife will probably have to go to work to keep not only herself but the sick husband and the children, if there are any. If it is the wife who is the tubercular, and a break comes, the husband is faced with the

problem of a broken home, doctor's bills, and in all probability hospital or sanatorium bills for a long time. If there should be children, the problem is greatly complicated. When both husband and wife are tuberculars and a break comes after marriage, the situation is better imagined than described. This picture is not exaggerated, as a visit to a sanatorium will prove. Listen to some of the tragic stories. See the number of husbands and wives who are both down at the same time, and be convinced.

The added worries and responsibilities of married life, the driving necessity of making a living and competing with well people, is often too much of a strain on the limited strength of the sick one, and a break comes.

In a marriage between a well person and a tubercular, the tubercular is always at a serious disadvantage. If the man is the sick one, he has his work and the sapping of vitality by the marital relation to draw on his strength. If, in addition to this, the well wife insists on entertainment in the evening the strain is very apt to be too

heavy. If it is the wife who is the sick one, then her home duties will be found sufficient, but if in addition the well husband likes evening entertainment, the strain may be too much for the wife. There is always present the danger that when the sick one cannot supply the necessary companionship the well mate may seek it elsewhere. When this occurs, the handicap of sickening worry and despair is added to an already heavy burden.

In no event are tuberculars justified in having children. It is unfair to the child and unfair to the parents. As has already been pointed out, every child has the right to be well born. A child is robbed of this inherent right when one or both parents are tuberculars. While it is true that the disease germs themselves are not transmitted, the weakness is. When both parents are tubercular the child has a double inheritance of weakness. If there should be children however, preventative and precautionary measures to safeguard the child's health, such as have already been outlined, should be used. In addition, if the child will be much exposed to the sun during all of the

growing years, it will in all probability be able to build up a sufficient resistance to avoid infection. When a business is made of scientific prevention for children, they are dressed only in a breechcloth and run practically naked winter and summer. It is wonderful to see such brown and nearly naked rascals playing in the snow. This is the only safe and just course for children of tuberculars.

Value of an Outdoor Life

Much misunderstanding exists in regard to the value of an outdoor life. Fresh air is a necessity for the good health of all human beings, whether sick or well. So is sunshine, but the idea that tuberculosis can be cured simply by adopting an outdoor mode of life is erroneous and entirely at variance with facts. Every occupation is represented among tuberculars. No healthier occupation in the world exists than farming, and yet a survey conducted recently of an equal number of city bred and raised children compared with an equal number of country raised children disclosed the fact that the percentage of tubercu-

lars was higher among the farm children than among the city children.

People are often advised when they become tubercular to go and live in the pine woods. This is all right, and the woods, either pine or any other kind, is a good place to go and take the rest cure, but to go and work in the woods would not be any help. When lumberjacks who have spent their lives in the pine woods come down with it, there is evidence that simply being in the woods is not "either a preventative" or a "cure."

Returning to the Old Occupation

Another serious misapprehension that is common is that after a "cure" it is best to forsake the old occupation if it was an indoor one for something outside. While not always true, depending somewhat upon the occupation, the general rule holds good that one will do best to return to the old occupation if physical condition permits. This does not, of course, hold true if it means working in dust, steam, or fumes that are irritating.

Returning to Former Locality

Another common misapprehension is that when one "cures" in a Western high, dry climate it is unsafe to return to Eastern and lower and more moist climates.

Thousands of people have taken the cure in the West and have returned East and resumed their occupations, and have lived for years a normal or semi-normal life, depending upon their condition. The danger of a second or succeeding breakdown is ordinarily no greater in the old location than it would be in the West.

It is entirely a matter of proper care, living, and working no matter where you are. Many people who are born and raised in the country where tuberculars go to "cure" break down with it, and many who "cure" and then take up their residence in such localities have rebreaks from it.

In deciding the question of where to live after a "cure" has been made one should consult with, and be largely guided by, the advice of competent and experienced physicians who have had a chance to observe thoroughly the effects of dif-

ferent climates. They will be able to pick out the comparatively small number of cases that should stay where they "cured."

Is There a Type That Becomes Tubercular?

Much has been said and written about a type of person that becomes tubercular. The claim has been made that most tuberculars are flat-chested or long-necked, or do not freckle or tan, or had other peculiarities equally as foolish. A check-up at a few sanatoriums among large numbers of tuberculars will soon convince any one that there is no such thing as a type of tubercular any more than there is a type among the people you meet on the street of any city. One will find every kind and conceivable type. Tall ones, short ones, dark ones, light ones, long- and short-necked ones, and those that freckle and tan, and those who do not. The visitor will see among them some of the finest built people one can meet anywhere. Every one knows people with stooped shoulders and flat or even caved-in chests who are healthy and never have a sick day. Every one also knows of skinny, sick-looking people who

are hardy and healthy. There is one characteristic of tuberculars, however, that seems to be as near one hundred per cent as anything human ever becomes, and that is that almost without exception they are energetic, high-strung, nervous, and often temperamental. Very few of the phlegmatic type seem to acquire the disease. The answer seems to be that it is the energetic, driving type of people who contract the trouble most frequently through exhaustion of their nervous and physical forces. For this reason a warning is given to this type to avoid exhaustion of any and all kinds, whether from sickness, worry, or overwork.

Everyone Has a "Cure"

Oftentimes a very small area of infection in the body will do great damage and pull one down so that he looks as sick as though there was much more trouble than there really is. For instance, an infected tooth or tonsil may cause serious damage. Likewise a very small area of a tubercular infection in the lung, if present and unchecked for some time, will spew out enough

poison into the system to drag a person down and make him look as though he were in the last and most advanced stages of consumption. For this reason the disease lends itself well to every kind of "cure" and remedy under the sun, providing there is plenty of rest mixed up with it. After one becomes tubercular, it seems that half of the people one meets know of a certain remedy or form of treatment that they claim "cured" some relative of theirs or someone they knew. Many times the sick one is induced to try some of these systems, and with most astonishingly good results, providing always that relaxation and rest in some form is included. It may be a camping or fishing trip, or just lying in the sun, or any one of many other simple ways of resting and relaxing. Because of the great benefit that comes from it, the particular system followed is given the credit, when as a matter of fact the only feature of the "cure" that was of any benefit and entitled to any credit was the rest and relaxation, which gave the body a chance to do its own "curing." In many instances some portions of the "cure" may have been positively detri-

mental, such as indiscriminate sun baths, especially where the chest was exposed. In cases of this kind when people get well they often do so in spite of, and not on account of, the "cure" they took. They had only a very small area of infection which responded easily to rest, and in spite of the fact that they may have appeared to be seriously ill they probably had very little the matter with them. They were just lucky. It is impossible to tell without the advice and help of an experienced physician how much of an involvement there may be, consequently no chances should be taken.

Only too frequently inexperienced doctors, and this includes doctors that are old enough and who have been practicing long enough to know better, advise the incipient tubercular either to keep on working or else take some kind of a light occupation. The economic condition of the patient becomes a factor here, of course, but if it is at all possible there should be no compromise made with the disease. There is only one safe course and that is to take the rest "cure" as quickly as possible and keep it up until thor-

oughly healed. Many people have gone along sometimes for several years, generally in poor health, trying to fool themselves into believing they would get well some day. People who do this, almost without exception, pay the penalty for their procrastination sooner or later, and unfortunately the penalty is sometimes the forfeiture of their lives. I want to emphasize again that tuberculosis when caught in its early or incipient stages usually responds quickly to treatment, but the longer it is allowed to run, the harder it is to control.

Tuberculosis a Mind Stimulant

One peculiarity of tubercular fever is that it seems to stimulate the mind. Many renowned and well-known men have been tubercular, and many of them have done their best thinking when the fever was upon them. At least one very well-known writer, Robert Louis Stevenson, author of "Treasure Island" and other works, claimed that the only time he had any inspiration was during periods of fever, and that at other times his mind was dull.

Reading and Studying When Fever Is Up

The practice varies in different hsopitals as to permitting reading and study during periods of high fever, one hundred degrees or over. In many places patients with this much fever are requested not to do any reading or studying. As a general rule it is probably best at least to restrict one's mental work at such a time, but much depends upon the temperament of the patient. If inclined to fret when the mind is unoccupied it is probably better to read some, but sensational matter, or any matter that unduly rouses the emotions, should be avoided. Study should not be indulged in until one is well enough to be equal to it.

Flies

So much has been said of late years about the fly danger that the public should be pretty well educated to it by this time.

This work would not, however, be complete without reference to it.

Years ago the house fly was called man's little friend. Later on it was learned that he carried

deadly disease germs on his filthy, hairy legs and body, and that instead of being man's little friend, he was one of his worst enemies. He feeds on almost anything from the worst filth to sugar, and picks up disease germs wherever he finds them, and deposits them wherever he lights, whether on food or on a baby's lips.

He is a scourge and a scavenger, and always a deadly menace to life and health, and should be swatted, trapped and exterminated.

He should be excluded from all sick rooms, but especially where one has an infectious sickness such as tuberculosis. Sputum from the sick person should not be exposed where flies can reach it, but should be destroyed by burning, and never thrown out or left around where they can reach it. If they do get to it they simply load themselves up with germs, and then carry and deposit them elsewhere. In this way other members of the family may be infected.

Hospitals understand this danger and guard against it. This information is furnished for the home when a tuberculous patient is being cared for, especially the farm home, as it is usually

around the latter that flies are most plentiful, owing to the manure and other refuse around the stables. Flies breed in filth.

Interstate Commerce Regulations

The Interstate Commerce Commission have some very common-sense regulations for the person with active pulmonary tuberculosis when traveling in public interstate conveyances such as railroad coaches, pullmans, busses, and boats. The sick one must be supplied with sanitary sputum cups, and either gauze or soft paper napkins and the mouth and nose be covered when coughing or sneezing. If sputum cups are not available, heavy paper bags, preferably lined with waxed paper, should be used. When bags are used the sputum should be deposited in either a paper napkin or piece of gauze, then placed in the bags.

These sputum containers, napkins, gauze, etc., used by the sick person should never be thrown away or left around indiscriminately, but should be well taken care of and always destroyed by burning.

Alcoholic Beverages

Opinion is very much divided among medical men as to the value of alcoholic beverages in tuberculosis; one school maintaining they not only have no value, but are positively detrimental; another simply that they have no value and humanity would be just as well off if none were obtainable; another that they are indispensable; and still another that takes a middle course and believes they have great value in certain cases. When medical men are so badly divided, a layman's opinion is as good as anybody's. My opinion is based on long personal observation and experience, and refers to its use in tuberculosis only. I know nothing of its use in any other sickness. I am convinced that properly used it has great value in the treatment of this disease. Health authorities will advise that the best plan is to so live and keep the body that no artificial stimulant is needed. Very fine, but when one becomes tubercular it is a foregone conclusion that this most desirable condition has not been achieved, therefore one must do the best he can

to help himself back to good health, or as near as he may get to it again.

For many years I was an officer in the operating department of one of our largest and best conducted railway systems, so have been in a position to appreciate both sobriety and the lack of it, as my experience dates from a long time before Prohibition. I hold no brief either for or against Prohibition, and have no intention of allowing a discussion of its merits or demerits to enter here, but it does seem that better methods of providing alcohol and alcoholic beverages in cases of sickness should be adopted. In some states the amount that may be prescribed by a physician is so small as to be useless, and practically everywhere the prescribing is so hedged in with red tape that physicians do not care to bother with it except at an excessive fee. The prices, too, for medicinal liquor are exorbitant and unreasonable.

It has been shown that alcohol is in certain respects a food, and only becomes a dangerous poison when taken in excessive quantities. These same qualities hold good for beefsteak and

bread. Not so long ago a Japanese man seeking to make a record died after eating forty bowls of soup, yet no one claims that soup is poison. When I was going to school the charts used in teaching physiology used to present as a horrible example pictures in colors of the interiors of the stomach and intestines of persons who used alcohol. If any one in real life ever had the number of ulcers that were shown in these old charts, he would have suffered tortures that no human being ever could have suffered and retained his reason for even an hour. I have known many people with stomach or intestinal ulcers, and one or two tiny ulcers have always furnished all the pain and discomfort they could stand. The only conclusion that can be drawn from these old pictures is that those responsible for their use in the classroom were more concerned with prohibition than they were with the spreading of correct information on physiology. We will have to admit they did a thorough job and had plenty of patience. It took a good many years for the leaven to work, but work it finally did. However, the indications grow stronger each day that

a better solution of the problem than the one now in use must eventually be found.

Let me say also that I have read statements made by prominent medical men that they had never seen gastric ulcers that could be charged directly to the use of alcohol.

Mild wines are valuable both as food and tonic. They contain elements in addition to the alcohol which are badly needed by the sick body of the tubercular.

Whisky and brandy are both food and tonic.

Such tonics are needed by the tubercular to stimulate the appetite and increase the food intake, for the reason that the disease works against him in a double way. The fever burns up his body and his energy, and at the same time wrecks his appetite, so that at the time he should increase his feeding he finds himself robbed of much of his desire for food.

I do not recommend the indiscriminate use of alcoholic beverages with tuberculosis by any means. They should never be used when the fever is up, or the pulse high, nor in cases where there is heart, kidney, or bladder trouble. In

fact, they should be used only with the advice or consent of a competent physician, but this is where the rub comes, for the reason already pointed out, that there is great diversity of opinion on the subject among medical men. This, together with the fact that they can be obtained only upon prescription by a physician, simply leaves the whole question in a very much unsettled and unsatisfactory state.

Insurance for Tuberculars

I do not know that all insurance companies will insure a healed tubercular, but am of the opinion that most of them will, providing the involvement is not too great, and also providing a certain definite time has elapsed since the trouble healed, and also providing the applicant is in good health and shows no sign of a recurrence of the disease at the time the application was made. None of them would probably care to issue health insurance and would in issuing life insurance no doubt "rate the applicant up"; that is, charge a premium in excess of the regular rate for the age of the applicant and the class

of policy desired. The chances are that they would also refuse to insert the total and permanent disability clause in the policy.

The best plan for the healed tubercular to follow when seeking insurance is to make a trial application. If this is rejected, it is done without prejudice to his future chances of obtaining insurance.

The time to insure is while he is well and before he becomes tubercular.

Occupations for Tuberculars

For those who are compelled to change occupations on account of their condition due to tuberculosis, a few suggestions are offered.

The occupations here mentioned have been tried and found practical by others, and as there is always room for more, they will always be available.

For those who like animals, the raising of various breeds of dogs and fancy cats gives a good return. It has the advantage of requiring only a small space and low initial investment. The work is light and takes one much out of

doors. If, in addition, flower and vegetable gardens are kept, it will be found to be a pleasant and easy way to make a living after one gets a start. One would do better to locate near a good-sized city, where there would be a market.

The keeping of bees is a pleasant and profitable occupation. Very little space is required. Even the small space of the ordinary back yard will do for a start. If one is to go into it very extensively, however, a little more space is desirable. Two or three lots on the edge of town, or a few acres a little farther out, will do. If there are trees for shade so much the better, but if not, shelter can be provided. Bee-keeping has the advantage that it need not be conducted in the vicinity of a city, but can be carried on anywhere, near a small town or in the country, provided there are plenty of flowers available. The best location is in the vicinity of orchards, and alfalfa or clover. The work in connection with bee-keeping is light and pleasant, and there is always a market for honey at good prices. There is also a good profit in the sale of queen bees and extra swarms.

If in addition to the bees one keeps vegetable and flower gardens, and has a few fruit trees, the living problem will be a simple one.

Bee-keeping requires considerable study and knowledge. There is plenty of literature on the subject, however. Additional information may be obtained from the Department of Agriculture at Washington and from state universities and agricultural schools. Many state universities give an extension or mail course on it.

Many have turned to the raising of bulbs and have done well. For this kind of work a small amount of good soil near a city is required. The work is pleasant, not too hard, and keeps one much out of doors. There is a good market for the fancy flower bulbs. The small amount of knowledge required to make a start may be acquired from books that are available, and to be secured from the Department of Agriculture and from state universities. A number of people have made themselves independent at this work.

In addition to the occupations just enumerated, a great many new ones have sprung up

within the last few years. There is the raising of rabbits for meat and fur. This requires considerable hard work, however. The raising of all kinds of fur-bearing animals—fox, beaver, muskrat, mink, sable, chinchilla, and in fact practically all of the fur-bearing animals that were formerly available by trapping only—are now being raised successfully. There is no limit apparently to the market for furs. It seems to be constantly expanding. There is never enough genuine fur to fill the need, and as a result millions of rabbit, cat, and dog skins are used annually to imitate the genuine.

The raising of fur-bearing animals does not require much space or initial outlay, and the bulk of the knowledge required must be obtained by experience. Enough written knowledge is available on the subject for a start.

Fish farms are now being successfully operated on a small scale and fancy fish, such as goldfish, raised, also many varieties of table fish, the favorite being trout, as they command the highest price and the best market around the large cities.

The raising of game birds, such as pheasants of several varieties, quail, and prairie chickens has grown to be a considerable industry with some six or seven thousand people already engaged in it. The market is good and constantly growing. The indications are that there is no limit to it, both for stocking purposes and for food. The returns are good when the business is properly conducted. The written knowledge necessary for a start is available from game associations and the Department of Agriculture. The experience can be gained only after making a start. The work is not hard and takes one much out of doors. The amount of space required depends upon the purpose for which the birds are raised.

Then there is the old favorite poultry farm where any kind of domestic bird, chickens, geese, ducks, or turkeys, may be raised on any desired scale. It is not necessary to go into it extensively at the start. It is astonishing what can be done with a small bunch of well-bred fowl.

If one desired an ideal outdoor life with not

too much hard work, a few well-placed lots or a few acres of land with a small bunch of chickens, a few swarms of bees, a pair of well-bred dogs, a small tank of fish, a garden, and a few fruit trees will furnish the easy outdoor life, and a good living without an excessive outlay of capital or too much hard work.

For those who have no capital and desire an occupation at which they may work part time, there is life insurance, always a fertile field for a good salesman. Bond selling has been badly overdone, and is rather a poor field just now.

Soliciting subscriptions for magazines and selling books is always profitable for those who have a bent for this particular line. Not all are fitted for salesmanship, but many are, and many who have had no previous experience will be surprised at their own success.

There are many other occupations suitable for tuberculars who are unable to return to their old ones on account of weakness or inability to work full time, and new ones are still being created.

A small amount of capital and a good stock of courage will often work wonders.

Conclusion

In writing this book it has not been my wish or intention to paint a dark or discouraging picture, neither have I tried to paint too rosy a one.

A few years ago a certain doctor was lecturing on tuberculosis in a large middle Western city and outlined so bright a future for the cured tubercular that one of the newspaper reporters wrote in his account that he thought it would be advisable for every one to get a case of tuberculosis so he might learn how to take care of himself. Such optimism as this is foolish and misleading, and does more harm than good. Too much effort has been made to magnify the rosy aspects of the case, such as the decrease in the death rate from tuberculosis, and not enough stress laid on the real fundamentals.

My principal purpose has been to lay the facts fairly before every one, whether tubercular or not, so those who are well may guard against it, and to furnish early enough help to those who have it so they may avoid the costly mistakes so commonly made. These mistakes specifically

are: failure to diagnose it early; a tendency to procrastinate in giving up to it; not starting a systematic "cure" until it has such a start that it is hard to check; while "curing," a tendency to do foolish things that undo all the good so far accomplished; after one has reached the point where he feels well and looks well to assume that he is completely cured and as strong as ever; a tendency to stop the cure too soon, or to take up active life too quickly, and so cause a serious setback; dependence entirely upon the "family physician"; and a tendency of all people inexperienced in the ways of sickness and of doctors to depend absolutely on "what the doctor tells you." After he has consulted with many doctors he will find that the number of different opinions he will get will depend largely upon the number consulted. It is well to know and remember that doctors are human and subject to the same limitations as the rest of us.

Because the weakness of the medical profession in connection with tuberculosis has been so persistently pointed out, the conclusion should

not be drawn that this book is intended to be hostile to the profession. On the other hand, the author, although himself the unfortunate victim of several of their mistakes, has the greatest respect for the many fine, competent, and conscientious men within the ranks, but it has been the wish and intention to point out without either bias or rancor the errors they commonly make in the handling of tubercular people, and in so doing, help others to guard against them.

The commonest mistake they make when they first diagnose an incipient case is to underestimate the seriousness of the disease and to fail to recommend the immediate starting of a proper course of rest. All too frequently they make light of the supposed trouble; apparently in an effort to avoid hurting the feelings of their patient. It seems impossible for many of them to realize that if the treatment is started early it is a much easier and shorter process to head it off, than if it is permitted to get a further hold.

It is customary, when the infection is slight, to recommend that the victim either continue at

his occupation or do some light work, or take a course of exercise. This is a serious mistake, and it is unfortunate that all doctors cannot spend a few years in the various sanatoriums in the country, and listen to the denunciation and bitter tales that are told by people who have been wrongly advised.

Some have been advised to join athletic clubs, some to take up golf, others to change from an indoor to an outdoor occupation, and so on. Even some of our greatest clinics have fallen down sadly in this particular.

When one's ailment has been diagnosed as tuberculosis, no time should be lost in starting the one and only treatment for it, the "rest cure." Either the treatment should start in the home or a sanatorium, but in any event, under the care of experienced people.

As a final summing-up of the situation, let all remember this rule: "Once tubercular always tubercular." A good "cure" may be made and the patient return to a normal life, but the danger is always lurking in the system.

However there is no need for despair. With

care and good judgment there is a real chance to live out the allotted span of life.

Here is the encouraging side of the picture.

Tuberculosis no longer holds first place as a cause of death. The death rate from it is steadily decreasing.

Although no specific cure is as yet known, the store of knowledge of the disease is constantly growing.

Whereas a few years back there was neither sufficient trained and experienced personnel nor sanatorium facilities properly to care for those needing it, both personnel and facilities are now adequate, with the exception already pointed out that there are not enough free institutions to care for those who are in need.

Let us hope that wealthy people who now donate so freely to educational and religious institutions will become more interested in the problems of the tubercular, and found more free sanatoriums, and help those already in existence. No more worthy field for the use of surplus funds exists. The nature of the disease, its long duration, and the crippled or partially crippled

condition in which it sometimes leaves its victims uses up their resources, and many times destroys or reduces their earning power.

Regardless of this fact and this need, thousands of tuberculars are now being restored that formerly either died or lingered along as invalids or semi-invalids. Of those being restored, a large percentage are returning to full usefulness while others are restored to partial usefulness, so they can at least help to support, and, in many cases, fully support themselves. Many who are unable to return to old occupations are finding new methods of getting along.

Thousands of tuberculars are dying now of old age after having conquered the disease many years before, and everywhere one meets cured tuberculars of every age who are going about their lives as others do. Many with badly shriveled lungs are getting along with occasional help in the way of artificial pneumothorax or rest periods.

I personally know of one physician who carries on a regular practice and who has been taking artificial pneumothorax for thirty years; an-

other who has been taking it for twenty-five years.

Although all has not yet been done that can be, great strides have been made, and the work is going forward.

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